



THE future of the world, as seen through the eyes of IBM, is an irresistible topic for any speaker and a guaranteed attention-grabber at any conference.

An original and challenging thesis on the subject was presented in Shadow II users at a London conference by Richard Currier, marketing vice-president of Altergo Inc.

We should, he suggests, forget about E-series and H-series, and

Leading into the electronic office

concentrate on word processing instead.

Noting that no new releases of Systems Network Architecture or IMS are scheduled, he deduces that IBM is hard at work re-writing them with a word processing slant and a 1980 deadline. He suggests that the result will be software which marries word and data processing, leading to an IMS database simultaneously used for text storage and numeric retrieval.

Satellite Business Systems, in which IBM has a one-third stake, is a major element in Currier's thesis. Satellites, he suggests, are really cost-justifiable only when they transmit large volumes of data or text.

Currier believes that IBM, with some 50 per cent of the

typewriter market, has spotted that it can make its next fortune out of giving those charmingly inefficient typists the tools to improve their productivity.

His idea of a large company's entire filing system being retained in some enormous electronic filing cabinet is probably quite feasible, given the phenomenal rate of decline in the cost per bit of hardware.

There is plenty of evidence that IBM is preparing to lead us into the era of the electronic office. It is noteworthy that the company demonstrated to the Press in Nice last year that the 3750 telephone-switching system could become the missing link in an electronic mail network of word processors and ink-jet printers.

Nevertheless, it is unwise to go overboard on any one product or scenario; IBM never does. Currier contends that transaction processing and time sharing are passing fancies, but IBM's history suggests that it can be relied on to continue to offer strong products for these markets for as long as the fad persists — and indeed, is currently emphasising the VSPC time sharing software.

It is certainly worth keeping a close watch on IBM's strategy in the office products market, but the E-series should not be written off. There is little doubt that it will be with us within months. As for the H-series, something fairly enormous will be required to store all those files, even if the databases are distributed.

One development under way at IBM not mentioned by Currier, but perhaps relevant to this thesis is the System R relational database, reported to be under test at Boeing Computer Services. System R sounds like just the thing for the company which has everything and needs to keep track of it somehow.

Call for setting up of world telecoms authority

THE establishment of a world telecommunications authority to rationalise and standardise communications laws, taxes, tariffs and equipment was one of the possible future developments discussed at the first full meeting held under the auspices of the Brussels Mandate.

It took place in London last week and was attended by legal and communications experts from organisations on both sides of the Atlantic, including the UK Post Office, the French PTT and the US telecommunications giant AT&T.

The meeting was organised by the Washington-based lawyer

club would be to make its deliberations public knowledge by having the minutes of its meetings generally available.

"The third aim is to initiate studies into the laws in various countries relating to things that affect transnational dataflow like privacy. The actual studies would be carried out by academic institutions and other suitable bodies."

"The meeting also decided that there was a real need for a much clearer distinction to be made between different kinds of internationally transmitted data, in order to separate data, as a commodity from information in the broader 'humanitarian' sense."

"But, before we can persuade national governments to change their telecommunications laws and tariffs, a lot more people need to be involved in this debate."

Multinational companies with representatives at the London meeting last week included Control Data, Digital Equipment, Unilever, Manufacturers Hanover Trust, American Express and Minisys-Ferguson.

Some of the other organisations represented were the Home Office, the Inter-Bank Research Organisation, the US Senate Foreign Relations Committee and the Italian inter-governmental bureau for information.



JOHN EGER... the club should have three main aims.

and telecommunications expert, John Eger, one time telecommunications adviser to Presidents Nixon and Ford.

He came up with the idea of an informal club for influencing world communications policy at the Online conference on transnational dataflow, held earlier this year in Brussels — hence the name, Brussels Mandate.

Commenting on progress at the first meeting, Eger told Computer Weekly, "Part of the purpose of this meeting was to define the role of the Brussels Mandate, and the consensus was that the club should have three main aims."

"One of these is to have several ongoing meetings each year at locations all over the world with no more than about 30 attendees at each. Typically, half of them would be telecommunications consumers, like multinational companies, another quarter government representatives, and the remainder academics."

"As time went by people from the developing countries could be drawn into the meetings along with smaller telecoms consumers."

"A second basic aim of the

Swiss companies seek to buy name of UK software house

By Tim Palmer

SEEKING to take advantage of an extraordinary provision of UK company taxation laws, a group of Swiss software companies wants to buy a UK software house.

Once acquired, the software house would immediately be trading in the UK, and would in turn take over the Swiss group, which consists of 14 companies trading in France and Germany as well as Switzerland.

In effect all the British company would be selling is its name, registration and reference list of clients.

Its former owners would be free to set up a new company with a different name and continue in business just as before, and would be paid "good money" by the Swiss group.

It may seem a little strange that anyone is prepared to pay good money for little more than a name, but it appears that if a company is registered in the UK but makes only overseas, it is not subject to UK company taxation. Apparently the 14 companies will aim to free from tax in the countries in which they operate.

Why not simply set up a new British company

rather than acquire a ready-made one? In order, it seems, to secure clients that they are dealing not with some fly-by-night operation but a solid and established British company with a ready-made list of customers.

The quest for a suitable British company is being handled by RAS Systems Design of Brighton, which says that it is already holding talks with a software house which is in liquidation. RAS says that the whole idea has been discussed with the Inland Revenue.

The group, which is already based in a remote valley in Switzerland where taxation is very low, is also planning to go into personnel recruitment in a big way.

The plan is to set up a database of computer staff, both freelance and currently employed but prepared to move, in order to provide a service to users who need to build up a large staff quickly.

A major recruitment effort will be made in the UK where it is hoped to find people willing to take jobs, typically much better paid, in continental Europe.

Welsh councils opt for ICL 2972s

FOLLOWING the announcement by Oxfordshire County Council (CW, June 8), that it is to install an ICL 2972, two other local authorities, Mid-Glamorgan County Council and Cardiff City Council, have said they are to follow suit and replace their ICL 1904S systems with 2972s.

The orders are worth £3.6 million to ICL and both computers will support a wide range of online terminals.

At present, Mid-Glamorgan County Council provides a remote job entry service to Ogwr, Rhondda, and Taff Ely borough councils and its other terminal users include the South Wales Police Authority, the

Welsh Joint Education Committee, plus a number of schools and county council technical departments. Applications include an examination processing system for the WJEC as well as files, fees and maintenance for magistrates' courts.

Cardiff City Council 2972 will provide computing services to South Glamorgan and the Vale of Glamorgan Borough Council. The system will also support terminals in schools throughout the county and in the South Glamorgan Institute of Higher Education.

Cardiff's machine, valued at £1.7 million, will be installed in March, 1979, and will feature 3 Mbytes of memory and 111 disc drives. The Mid-Glamorgan system will be installed in June, 1979, and will have 111 Mbytes of memory and 14 disc drives. It is valued at £1.9 million.

The Oxfordshire County Council 2972 will provide computing facilities to all five districts in the county and it has been estimated that the switch from an ICL 1904S to a 2972 will result in a saving of more than £500,000 over seven years. This system will have 2.5 Mbytes of main memory.

The London Borough of Southwark, one of the founder members of the Joint London Borough Computer Consortium, which has now virtually disbanded (CW, March 30), is to

CIH-HB takes control of French micro firm R2E

MOVING up planned into the microcomputer and terminals fields, CIH-Honeywell Bull has taken a controlling interest in French microprocessor pioneer R2E. The move has given the micro company an injection of FF2 million, about £240,000, which it needed for expansion and development projects.

CIH-HB is expected to increase

its share of R2E to about 80%, but the company will remain technically and commercially independent under its founder, Vietnamese-born Thi Truong. R2E is looking for a turnover of FF25 million this year, up from FF22 million in the year to March, 1978, and has just opened a US subsidiary in Minneapolis.

Motorola to enter market for firmware interpreters

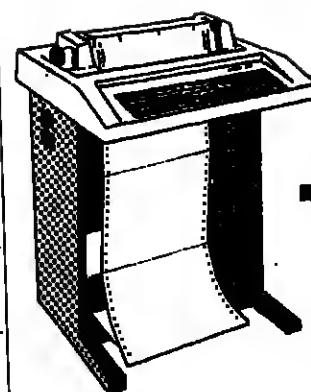
PLANS to enter the market for firmware interpreters and applications packages for use with microcomputers are well advanced at Motorola. Gary Daniels, director of MPU design of the company's Austin, Texas, plant, says a 24K bit ROM is being developed that incorporates an 8K byte Basic interpreter. Plans for firmware applications packages are at present less well advanced because the market is as yet undefined.

One major problem is that the microprocessors used in systems

employing firmware chips need a position-independent code. This is an important factor for without it the device manufacturer becomes involved in the design of the system as well as the components. Currently, the components are independent, according to Daniels, few microprocessors are position-independent.

One that does is Motorola's 6800 processor and another will be the 68000 MACS (Motorola Advanced Computer System) to be introduced shortly. This 16-bit device will be equipped with 32-bit internal registers.

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COMPUTER WEEKLY

Vol. 24 No. 605
Thursday, June 22, 1978

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IPC Electrical Electronic Press Ltd.
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London, SE1 1LU.
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Telephone: 061-972 4231.
New York: 205 East 42nd Street, New
York, NY 10017.
Tel (212) 697 2080 Telex 421710.
Published weekly on Thursday
except on the first of the month as a
newspaper. Price per copy 15p.

IPC Business Press Ltd 1978.

Computer Weekly is not free of charge in the
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Controlled Circulation Department: IPC Business
Press (UK) Ltd, Distribution Ltd, 40
Bentley Street, London SE1 1UE. Tel
01-497 3000.

Subscriptions for readers outside the above
countries: One year: UK £14.50, overseas
£20.00. Six months: UK £7.50, overseas
£11.00. Single copies 15p. All rates are
subject to change without notice. Payment
should be made by cheque or sterling order.
Subscriptions: IPC Business Press
UK and Ireland: 40 Bentley Street, London
SE1 1UE. Tel 01-497 3000. Telex 421710.
Each issue can be had available for 40p
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Computer Weekly has a circulation
each week of over 22,000 including the
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Ten years ago...

COMPUTER WEEKLY
JUNE 20, 1968

IN SPITE of opposition, a computer "with significantly better throughput than Aldi" was to be built at Manchester University with the help of a £200,000 grant from the Science Research Council. Evidence produced by computers was to become admissible in Scottish civil courts under two new clauses proposed by the government in the Law Reform (Scotland) Bill. Flight testing of the RAC 111-500 series engine was being helped by the use of an Elliott 903 computer. Air Canada placed a digital display system order worth £12 million with Raytheon for a seat reservation and communications system. The rapid identification of fingerprints by computer using pattern recognition techniques was being studied at Strathclyde University. A computerised system controlling the distribution of natural gas throughout the UK was to be developed by the Gas Council.

INTERRUPT

ONCE upon a time a very large British company was proudly, and nervously, demonstrating its new sales application to all the important people in selling from its offices all over the UK.

This was in the days of the immortal IBM 1401, and just about the first big application this very large company had ever developed. Everybody was there including a very young, and very raw, programmer.

In the middle of the invoice run the entire system stopped for no apparent reason. Team leader Frank and all his men ran round in circles looking for clues until, having reached that state of desperation when anything will be tried, somebody hit the start button on the line-printer, and it all went like magic from then on.

Nobody ever knew that the young, raw programmer had been leaning on the line-printer and had bumped the stop button with his elbow; nor did he ever say — until today.

The Moral: Keep them out of the computer room while they still don't know where their elbows are.

© The week's 26 Interrupt Price goes to Gary Harrison of Belfast.

Itel Laser Printer: read the facts.

See page 13

DOWNTIME

by Chad

Read it and see

THERE is an oft-told tale about some monks in the Middle Ages who were trying to determine how many teeth a horse had. They pondered, they theorised, they searched exhaustively through Scripture, but still could not agree. Then one of their number suggested looking in a horse's mouth and counting the teeth.

The other monks were horrified, appalled. They chastised their colleagues severely for making such an outrageous suggestion. Nowadays, of course, we realise how primitive and irrational they were. Nobody thinks like that any more, right?

Wrong. General Motors in the States, suspecting that its technical manuals may be difficult to read, has devised a computer program that calculates the average sentence length and word length in a piece of text and comes up with an index of "readability." Manuals that score badly are rewritten (by a human being).

Here is a passage that failed the test: "If your vehicle is equipped with a stowaway spare tire, your spare is designed to provide you with more usable interior space. The spare is located in a deflated condition resulting in a reduced overall diameter."

After rewriting, it became: "If your car has a stowaway spare tire, your spare provides you with more usable storage space since it is stored deflated."

The mind reels. If you want to know if something is readable, you don't attack it through a computer, you read it. Writing style is a wholly subjective thing, and no amount of computer analysis will make up for writers who have no aesthetic sense of how to communicate. The thought that there are people at GM who write phrases like "located in a deflated condition" and are paid for it is painful.

Why don't they just say it saves space to let the air out of the spare?

Keeping it clean

IN the world of high technology, keeping it clean is a serious business and the latest aid for keeping mukey people and clean components apart is this chic little number from Tok Chemicals.

The one-piece romper suit for adults is, I am told, made of a special non-woven fabric which is a much better bargain than more expensive woven material, and there are turtlenecks, trousers, smocks and other gear to suit the occasion. As well as protecting the lad inside from oil spills or industrial hazards, Confal, that's what it's called — will also retain "body and undergarment odours".

And after a hard day at the lab you could trot off to a fancy dress ball as an adorable snowman.



Of mice and machines

FIRST heats of a worldwide micro-mouse contest, organised by the Institute of Electrical and Electronic Engineers, were held at the NCC at Anaheim. Contestants build a mouse from micro components and it has to find its way through a maze.

Although over 6,000 people have entered the 1978 competition, the organisers expected only about 900 eventually to turn up with the workable mice at heats to be held throughout the year.

At Anaheim, many of the entries failed to reach the starting gate and there were many aborted runs. One mouse, for example, kept getting as far as the first bend and then going back home.

THERE will be significant progress on the development of standards for open system interconnection during the next fortnight with meetings being held in Washington, Paris and London by three specialist groups

working under the auspices of the International Organization for Standardization. UK participation in these studies is the responsibility of a British Standards Institution committee known as DPS/20. This

article emphasises the need for standards in this area and outlines the technical approach being taken. It was prepared on behalf of DPS/20 by a group chaired by Dr Roland Roemer.

Standards for open system interconnection

OPEN System Interconnection is the notion that any computer program, terminal or user may communicate meaningfully with any other. The advances being made in computer communications technology now make such a concept feasible but only if the appropriate standards can be specified and universally adopted. This article outlines some of the benefits to be derived from open working and describes the work being undertaken by the standards organisations towards this end.

The property of "openness" is intrinsic to any general communications medium such as the postal and telephone services. The advent of new public data networks creates the possibility of extending such openness into the area of computer systems. This could lead not only to enhanced use of existing facilities but also to the introduction of a wide range of new applications such as the "cashless society", electronic mail and home computing. Users will be able to access an ever-increasing number of services from the same terminal equipment; information will be readily exchanged among different machines; tasks may be performed by partitioning them for execution on several co-operating computers; databases and access to them may be geographically distributed.

Historically, it was the need to access powerful mainframes and centralise databases which stimulated the development of computer communications systems. This led to the concept of the familiar star network with a number of remote terminals around a central computer. Within such a closed system, the computer determined its own rules to be obeyed by all the terminals and intelligent devices requiring access. The result has been a proliferation of proprietary conventions which have very little in common with each other.

Two parties wishing to exchange data or to access shared

information could agree among themselves on the conventions to be used. But such bilateral arrangements become unmanageable and expensive as the number of interconnections increases, thereby severely limiting the range of applications. Advances in computer and communications technology now make distributed systems technically feasible and economically attractive. However, whereas standards in areas such as card codes are a convenience when decks are moved from computer to computer, open system interconnection is absolutely impossible unless the appropriate standards are specified and implemented.

If standards are not agreed quickly then pressures from powerful customers will force manufacturers to adopt less than ideal de facto solutions. The telecommunications industry which sees in open working the possibility of immense extensions to its business realises the importance of standards in bringing this about. The administrations of the new public data networks have indicated through their international organisation CCITT that they might take their own steps if there is undue delay by the standards bodies.

The British Standards Institution was among the first to realise the importance of standards for open system interconnection and last year proposed to the International Organisation for Standardisation that the subject merited the establishment of a specialist sub-committee. The proposal was accepted and the ISO Technical Committee 97, which handles standards for computing, set up a new group with the formidable identifier ISO/TC97/SC16. To co-ordinate work, BSI/DPS/20 was formally established as a sub-group of the BSI Data Processing Committee. DPS/20 is now actively engaged in its work and has identified an initial set of topics to be studied

in depth by its working groups. At the recent meeting of ISO/TC97/SC16 in Washington, the sense of urgency generated a welcome spirit of international co-operation and a realisation that, to be more manageable, the subject should be divided into three smaller areas. These three sub-groups will cover all the subject matter of the UK working groups.

Over the years, the approach taken towards the construction of computer operating systems has gradually evolved to become one in which individual functions are performed by well-defined modules or groups of modules. The overall structure is "layered" in such a way that the functions provided by one level can be utilised by higher levels.



Dr Roland Roemer is a principal scientific officer at the Rutherford Laboratory and a member of the Network Unit of the Computer Board and Research Councils.

Further, no level need be aware of the detailed mechanisms for achieving functions at any other level. This allows the construction of the system to be undertaken by several groups working in parallel, provided only that the interfaces between modules and levels have been rigorously specified beforehand. A further advantage is the ability to replace modules and levels when hardware is changed or when more efficient software is available without disrupting the total structure.

The basic model currently under study for open system interconnection follows a similar layered approach. The main levels so far identified are an applications layer; a transport service which offers a secure transmission path to the applications layer; and a communications layer which connects the transport service to the transmission medium.

The relationship between the components in a given layer and their opposite numbers at the other end of the communications facility is called a protocol. In particular, this components in the applications layer communicate by means of high-level protocols. The structure described allows these high-level protocols to be specified in a

manner which is independent of the nature of the transmission medium, which could be, for example, on X25 network.

The operation of a protocol begins with the establishment of a channel along which information is to flow. This is followed by a negotiation phase when the rules governing subsequent interactions are agreed. During the transfer phase, data is exchanged together with signals which assist in the control of errors, synchronise the data flow or permit the rules of the dialogue to be modified. The end of the transfer is effected by terminating the dialogue and closing the communications channel.

DPS/20 is concerned with the specification of the transport service and the applications level protocols.

Areas of study are: Refinement of the model: One of the DPS/20 specialist groups is studying the details of the model with a view to specifying an unified set of concepts and definitions which will form the basis of the other studies.

The Transport Service: Another group is concerned with the functions of the Transport Service and the definition of its interfaces with the communications and applications layers. The nature of the Transport Service when the communications medium is on X25 network will also be studied.

High Level Protocols: The components of the applications layers will be subjects of study for a long time. DPS/20 is initially concentrating on basic protocols upon which more elaborate structures may be built later.

File transfer protocols permit the transmission of bulk data among computing systems. Several such protocols have already been defined including a contribution from the UK High Level Protocol Group. These are being examined with a view to extracting the best features of each for synthesis and expansion into a possible standard.

The concept of the virtual terminal has been developed to overcome communications problems caused by incompatibilities among the large number of available terminals. Its purpose is to make it unnecessary for components in applications layers to cater for the details of the particular terminals with which they are communicating.

In parallel with the work on specific protocols, a study closely related to the elaboration of the model, is in progress on the common features of all high level protocols. If these can be determined, it will be easier to define and implement future protocols.

Because the issue of open system interconnection has only recently gained wide prominence, DPS/20 recognises the need to produce some descriptive material about its work for the wider community likely to be interested in or affected by the topic. Accordingly, one of its sub-groups has been assigned the task of preparing information for this purpose. This note is the first of this kind and the reports will be issued as the work proceeds.

Microwave links for Leyland factories

MICROWAVE links providing data communications at 50,000 bits per second are part of a network that connects more than 30 factories and depots of Leyland's BL Cars group to a data centre at Redditch, near Birmingham. The centre, which was officially opened on Monday, is taking over mainframe processing work handled until now by machines that include twin IBM 370/158s at Cowley, Oxford; an IBM 370/145 at Solihull, Warwickshire; and an IBM 370/145 and 370/158 at Loughborough, Birmingham.

NEWS IN BRIEF

LT £50,000 modems order

TO use its private telecommunications network for data transmission, London Transport has placed a £50,000 order with IAL for dial-up and permanent link modems.

At present data transmission is via Post Office modems on the public switched telephone network.

NCR additions

THREE additions to its 7750-2000 family of proof and encoding systems for banking have been announced by NCR. Known as the 7750-2300, 7750-2400, and the 7750-2500, the new models offer increased power and additional capabilities to NCR 7750-2000 series users. They are stand-alone systems which can be upgraded to operate as workstations for the NCR 7750-3000 distributive document processing system.

Standards agreed

RECOMMENDATIONS on standards for the exchange of bibliographic information have been agreed at a symposium in Sicily, between representatives of abstracting services, libraries, the ISO, and the UN. The symposium agreed that a common exchange format should consist of a record structure, content designators, and data elements, and that the record structure should be accepted as the existing ISO 2709.

Plessey venture

TWO Plessey companies, Plessey Ireland and Plessey Electric, have been appointed agents for telephone, telex and facsimile terminals communicating via Marlink satellite links operated by Comant General of Washington DC, and working on offshore oil exploration around the coast of Ireland. Plessey will market, install, and maintain the terminals.

Prime installation

GECS, the Liverpool-based computer bureau, has installed a Prime 300 system for use in batch and time sharing applications. The bureau offers a range of accounting and general computing services to companies, and has developed commercial, mechanical and electrical engineering software.

Bisquit system

BISQUIT makes Chiltonian of South London has ordered a 100,000 12K byte CIL 8050 to handle accounting procedures, order processing and stock and production control.

Service company for lawyers

A NEW company, Oyas Computers, has been formed to handle all the legal and systems development services provided for lawyers by the London Law Association. In particular, it will market the recently introduced online legal research system. Other services available are time-costing and payroll packages. These services are used by accountants and other business as well as solicitors. Further system products and services are under development.

Stockport and Gwent magistrates in lead

MAGISTRATES' courts in Stockport and Gwent are to be among the first courts to implement ICL's recently released Magistrates' Court System.

Stockport Magistrates' Court is to use an ICL 1904A system operated by Stockport Metropolitan District Council to run the package, and court staff will access the system via the court and linked to the main computer through a 7502 terminal processor. This system will eventually replace a Burroughs visible record computer.

It will also help to clear a backlog of £200,000 worth of outstanding fines.

Magistrates' courts in Gwent will use an ICL 2903 system with five 7502 and two 7181 terminals to run the software package, and the order is valued at £150,000.

The 7502's will be installed at magistrates' clerks' offices in Newport, Bedwellty, Cwmbran and Usk and will be linked to the 2903 in Newport. Police in Newport will have a 7502 while police in Blackwood and Pontypool will use the ICL 7181 terminals.



MD of DRE

FOLLOWING its formation earlier this year (CW, January 16), Data Recording Equipment now has a managing director.

He is John Armstrong, formerly managing director of GEC-Elliott Process Instruments Ltd.

Armstrong has also joined the board of Data Recording Equipment Co which controls DRE and two other companies, Data Recording Heads and Newbury Laboratories. DRE embraces all the operations covered by DRI before its status was changed to that of a holding company. Products manufactured by DRE include floppy and cartridge disc drives and matrix printers.

Conflicting views on ICL shares

WHILE investor confidence in ICL remains strong, with the shares tending to rise with the market and to stand firm when it falls, two stockbrokers' reports on the company take strongly contradictory views.

Quilter Hulton Goodison & Co recommends its clients to hold the shares, noting an encouraging outlook for the second half of the company's financial year and forecasting pre-tax profits for the full year of £37 million.

It rates the first half performance — pre-tax profits of £15.8 million on turnover of £232.1 million — as creditable, given the industrial relations problems of the October to December quarter, says that real growth continues at 20%, and attributes the increased interest charges (£5.8 million in the half-year) to stockbuilding of 2950s and 60s for delivery later this year and next year.

It also puts into perspective the adverse government report on the performance of some large 2900s, pointing out that it is "by no means unusual for early installations of a completely new computer to en-

counter teething problems that take some time to resolve", adding that ICL is confident that no fundamental problem exists and that the government is satisfied with the steps that have been taken in the three or four installations where problems have arisen.

The view from Scott, Goff, Hancock is decidedly bleak, and recommends clients to take advantage of further strength in the share price to reduce their holdings.

"The bulk of ICL's problems lie with its software development programme, and profits reported are largely due to smaller machines where software is less important. Our fear is that price cutting will ultimately extend to this market segment, especially as IBM will be launching its new E-series shortly."

"ICL should report a useful pre-tax profit increase this year, but the fundamental position is still fraught with considerable uncertainty," it concludes.

● ICL shares broke through the 300 pence barrier last week. They stood at 206 pence at the beginning of the year.

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Handling a small tricky problem

just like a Grandmaster



IT IS not customary for this column to eat its words. Today, however, I think that a judicious eating of the word "not" may be in order. In my fantasy of the British Cabinet attempting to discover in 1986 what is meant by "expert system" I said that "not a single centre in the UK is engaged in such studies" (Privateview, March 30). These smart and useful programs are proliferating with gusto in America and Japan. I have, for example, noted in this column Todd Wipke's program SECS among others. SECS acts as an intelligent assistant to chemists desirous of planning ways of synthesizing new compounds (Privateview, January 19).

However, I overlooked the North London Polytechnic where they have mounted the chemistry program LHASA, described by its British co-developer Dr A. P. Johnson as "superior to SECS in many aspects of its performance". The work is an off-shoot of Professor Corey's laboratory at Harvard University in the US, where Dr Johnson spent a sabbatical year. The Science Research Council contributed the graphics facilities needed to run the program over here and continue its development.

Almost everybody tends to confuse "expert systems" of the SECS and LHASA kind with very large databases of useful scientific facts. The difference is that you can only answer a question by reference to a database if the answer is already stored there. An "expert system", which may itself enjoy access to one or more databases, answers questions by reasoning and intelligent conjecture. What it stores consists not only of individual facts but also of more general patterns, rules and "theories", by means of which it infers its answers.

Together with our own miniature "expert system" for chess endings at Edinburgh (also developed with assistance from the Science Research Council) we have access to a database for the complete sub-game king-rook-knight. Tim Niblett has used this database to show that the expert text on this ending, prepared by a great Grandmaster before the computer era, is seriously incomplete and erroneous.

The expert system for this same ending differs from the database in many ways, including its amsil memory requirement. Within this condensed space it deploys a repertoire of pattern-based rules, constraints and goals, and handles this small but tricky problem like a master. We hope to teach it to do a good deal better than the average master!

The king-rook-knight database comprises some 3½ million legal positions. Addition of another two or three places to the board would create endings for which database construction would not be feasible because of the combinatorial increase in size of the problem space. For such endings an "expert system" is the only possible approach.

With so many enticing applications for "expert systems" in geology, medicine, botany, chemistry and other branches of applied science, why cheat? Such a game is surely a parlor accessory rather than an instrument of serious business!

To answer this would require a separate article. Let me here only list four fundamental questions on which research is needed: (1) machine representations of human knowledge, (2) numerical measurement of knowledge thus represented, (3) methodology for ensuring and certifying reliability of expert systems and (4) conversion of knowledge refined by machine into human-usable forms. These basic questions can make fastest progress, in my view, if applied studies are coupled with "test-tube" investigations.

For these, chess is ideal, not least because for more than a century highly trained human intellects have done the best job they could at intensive refining and codification of this particular domain of knowledge. If we believe, as I do, that computers have given us a new trick, by which vastly improved codifications can be made, then it behoves us to use for comparison the best specimens of the pre-computer art that can be found.

The first autocodes were tested using "test-tube" arithmetic. So in the development of new species of knowledge-handling languages experiments with the re-codification of chess skill have a part to play.

Donald Michie

DEC launches TP system for PDP-11s

A TRANSACTION processing system has been introduced by Digital Equipment for the PDP-11 minicomputer family. Called Trax, an essential component of the new system is DEC's first block-mode intelligent terminal, designated the VT82.

Trax runs on the 11/34, 11/60, and 11/70 supporting 16 terminals simultaneously on the 11/34 and up to 64 terminals on an 11/70. User application languages supported are Cobol and Basic Plus 2.

The VT82, a new micro-processor-based VDU, is used to provide basic screen handling and data validation functions. Programmed in an English-like Applications Terminal Language (ATL), the terminal relieves the central processor of data validation tasks.

Transmitting data to the PDP-11 in blocks — rather than character-by-character — the terminals reduces processor overhead and enhances line efficiency.

Although re-entrant, the central Trax software is not described by DEC as multi-threading. Rather, the system is intended to support a large number of small transaction modules, each of which will handle a single message.

By implementing screen handling and data validation routines in the terminal, contention for CPU-resident tasks is significantly reduced, explains the company. In critical areas, the CPU overhead can be further reduced by loading more than one copy of a frequently-accessed module.

In support of TP operations, the system includes facilities for restart/recovery, data protection, file organisation, and record access.

Trax incorporates its own operating system, rather than being built on an established DEC system such as RSX or RSTS. The system thus requires a dedicated machine.

However, facilities are included for concurrent program development and batch processing, the latter being described

as similar to those in the large-scale IAS operating system. A special terminal, the VT82, is offered by DEC for use in program development only.

The system also includes built-in communications options, enabling several Trax installations to exchange data and inquiries. Mainframe communication options include emulation of 3271 protocol.

Trax fills a long-standing gap in DEC's software for the PDP-11 range. As a result, one system developed by DEC for a specific customer has already been adopted by the company's Special Systems Division. Introduced earlier this year (CW, January 5), TPM 70 is said to have no direct relationship to Trax.

SOFT BITS Accounting package

A RESOURCE accounting package has been produced by ICL DataLink for 2900 users running under VME/B. The package processes data in the VME/B accounting journal to generate resource utilisation reports.

The routines also provide for the definition of installation charging rates, so that invoices can be raised automatically. In addition, ancillary charges, such as for data preparation, can be included on reports and invoices together with explanatory text.

A NEW package from SPI, designed to facilitate the connection of remote polled terminals using 3270 protocol to a PDP-11 running under RSX-11M. The software, written in Macro 11 assembler, consists of a DVII driver handling a binary synchronous line in non-transparent EBCDIC mode, and a 3270 protocol handler running as a system task.

A spokesman said that TPM 70 was intended for a more specific environment than Trax, being particularly suitable for applications written in Fortran or Assembler.

Users have also been actively developing TP monitors for the PDP-11. The most recently announced system was that developed by Lloyd's of London for its 11/70 installation (Software File, June 8). Logica has also developed TP software for the PDP-11 which has supplied in embedded systems.

A TP system was among the presentations at the DEC User Group conference in San Diego last autumn and a Norwegian user is also understood to have developed similar software.

A SMALL business systems group has been set up by Software Sciences to specialise in small IBM systems, such as the System 34 and the 5110 desk-top computer. The group, built around a nucleus of nine commercial analysts and programmers, will provide the full range of system design and implementation services.

A DATA preparation service has been introduced by Sharpe Bennett Associates, based on its old offices at Lancing, Sussex. Formed 2½ years ago to design and program commercial systems for small-to-medium computers, the company has moved to 1 Aldworth Parade, Goring-by-Sea, Sussex. Tel: Worthing 803344.

A GENERAL ledger system designed for financial management has been launched by 13 Software Services, of Worcester. Written in Cobol, the package will probably be of most interest to existing mainframe or minicomputer users, says the company. K3, a subsidiary of Kalamazoo, was formed earlier this year (CW, January 12).

Program exchange scheme likely to be opened to all

A SCHEME for the exchange of educational programs is likely to open its doors soon to include individual in addition to institutional members. The Central Program Exchange, previously known as the Physical Sciences Program Exchange, is also broadening its range to include engineering, mathematics, computer science, biology, and management sciences.

The Exchange, which offers software in the broad area of computer assisted learning, specialised at first in chemistry and physics. Not to be confused with computer aided instruction, CAI, programs typically employ simulation techniques

to permit experiments which would otherwise be too costly or difficult to perform. Originally a project within the National Development Programme in Computer Assisted Learning (CPE), was established almost five years ago (CW, October 11, 1973). It is based at Wolverhampton Polytechnic, under the direction of Dr Graham Beech.

CPE offers members a program library currently containing around 175 items. In exchange for a £25 subscription, institutions are entitled to select an initial 30 programs, each further program taken incurs a £2 handling charge.

Alternatively, if a program submitted is

accepted for the library, a further four programs may be selected free of charge.

The scheme, previously 100% funded by NDPCAL, now meets half its operating expenses from subscriptions and receives the remainder as a grant from the Council for Educational Technology. The Council has yet to approve the extension of the scheme to the personal computing fraternity.

If given the go-ahead, CPE is likely to offer a reduced rate to individual members, probably offering 10 initial programs for a subscription of £10.

Around 100 of the current programs are written

in Fortran, with the latter will run on a remainder in Basic. Most of Dr Beech, and conform to machines, according to standard for Basic.

Programs submitted for inclusion in the NDPCAL are tested by CPE on its own machine and sent for review to an acknowledged expert fifty subject area covered.

Starting in September, the CPE is to publish a series of booklets describing the programs available in each subject area. Dr Beech noted that the scheme is thus offering academic recognition to program authors for the first time in the history of program exchange.

CICS users complain to Price Commission

UK users of CICS have complained to the Price Commission over IBM's increase in the annual rental charge. The complaint has been lodged by the UK CICS Guide group, a sub-group of the users group Guide.

The programming group of the IBM Computer Users' Association has also voted in favour of pursuing an appeal. The two bodies are thus in effect taking joint action against the company.

Users were upset because the price rise, from £3,000 to £6,000 per year, coincided with a reduction in the level of support. Previously included as a programming product in service group B, the software now receives class C support.

The complaint relates only to OS Standard and DOS Standard versions of the TP monitor. Although also the subject of a price rise, CICS/VS is still supported at the same level and has recently been significantly upgraded.

John Smith, chairman of the UK CICS Guide Group, estimated that about 50 UK DOS users were affected and around six OS users. The standard DOS version was widely used under installations with only a few terminals. Such sites saw little advantage in investing in the conversion to CICS/VS.

The Price Commission has asked IBM to provide written justification for the increased charge and is still waiting for a response from the company. IBM announced the price increase last July, to come into effect in January. At around the same time, it also gave notice of the forthcoming change in support level.

IBM's VSAM has been adopted by a South Coast consultancy for marketing in the UK. The software, Vsamco, was developed for a major Swiss bank by Utelco AG and is said to have been installed at 40 sites in Switzerland, West Germany and Austria.

Vsamco supports all three types of VSAM data set, replacing IBM's more complex

user-program interface with a single Call instruction. Based on a general-purpose module with a single entry point, the VSAM operations required are specified using link area parameters.

The interface enables inexperienced programmers to make full use of VSAM facilities without having to master the cumbersome IBM coding sequence, according to the company. In addition, for Cbol users, it eliminates the need for

VSAM offers a number of throughput advantages over ISAM, including reduced access time degradation as files become disorganised, and a consequent reduction in the frequency of file reorganisation.

Marketing agent for Vsamco in the UK is RAS Systems Design, 48 Portland Avenue, Hove, Sussex. Tel: 0273-411109.

Compower addition

THE latest addition to the range of software offered by the National Coal Board's Compower subsidiary is a system for the design and evaluation of multi-ended pipeline systems.

The system, Pipestrass, is available on the Compower network under a marketing agreement with Babcock and Wilcox, which developed the program suite.

APL interpreter developed by Harris

AN APL interpreter and a new language processor for Basic have been developed by Harris Computer Systems for the Series 100, 200, and 500 machines.

In contrast to Harris' existing Basic, the new version functions both as an interpreter and a compiler. Called Basic-V to signify its operation in a virtual memory environment, the processor is re-entrant and also generates re-entrant application programs.

Several users may thus share the same copy of the language processor or concurrently execute the same copy of an application program.

Basic-V includes a number of interesting and unusual language features. One of these is the capacity for variable names up to 31 characters in length. In contrast to the great majority of implementations which allow only a single letter optionally followed by a digit.

Greatly improving program legibility, the facility for longer names has so far appeared in

very few Basic processors. One such is Hewlett-Packard's implementation for the new System 45 desk-top computer, which permits names including up to 15 characters. Another is a commercial Basic developed by Logica for the Tandberg TDV 2100 terminal. (CW, February 23).



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PROGRAMMER NOTES

Some approaches to problem-solving

LAST week's Programmer Notes introduced some of the basic concepts of Lateral Thinking such as de Bono's use of random juxtaposition in problem solving.

There are four overall approaches to finding solutions using the methods already outlined.

The first of these techniques is called by de Bono, General Strategy. Avoiding the nit-picky implementation details, this approach concentrates on the basic themes focusing where appropriate on considerations of cost or time.

Before launching into General Strategy, one must decide which variation of the approach is to be adopted. The first is thinking out from the problem and seeing what happens. The other is to reverse, thinking in from where one wants to be the target, and attempting to back-track to the actual problem.

Having decided which approach is to be taken (or perhaps having opted for two teams to cover both variants), the next step is to identify a number of alternative solutions. This is again done in a general, non-specific way, and may involve Lateral Thinking or may involve Lateral Thinking or may involve Lateral Thinking.

Next, try and spell out all the basic aims of the project. The objectives of a payroll system might be to pay salaries, collect taxes and national insurance, supply time-sheet costing information, and to simplify the payroll clerk's tasks.

Having done this, question each objective or alternative aim using various criteria. Such interrogation could, for example, establish the relative importance of paying salaries, collecting taxes and simplifying manual procedures.

A deliberately introduced provocation, perhaps a random analogy, can be used to sort out the alternatives. Take, for example, an analogy with making an omelette: breaking, mixing, and cooking eggs together.

In the payroll case, should the eggs or salary, be kept separate, or should the management costing data, rather than attempting to process both together, possibly two systems be used instead, rather than trying to meet both aims with one solution.

After General Strategy, the second technique is Implementation and Tactics. This involves spelling out each possible implementation method, including obvious logical approaches and then analysing each possibility identified.

In a supermarket, one best problem is optimising distribution of goods within the shopping area, so what, for example, would be the best method of implementing a test system other than trying every commodity in every position?

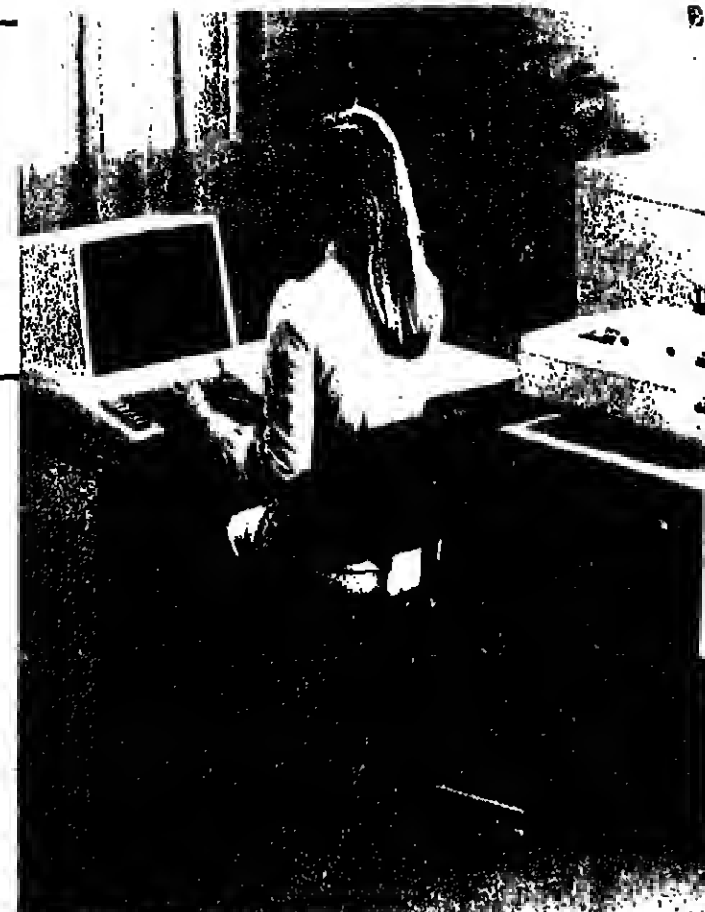
De Bono's third problem-solving method is probably the most confusing, based on the notion of an Idea Sensitive Area (as de Bono calls it) involves finding an innovative concept in an area where having such an idea will yield considerable benefit. It is important, at this stage, to try to ignore possible practical difficulties.

Lastly, is a technique called "In The Course Of". Useful ideas may arise out of seemingly unrelated discussion, or from an article on another subject.

De Bono felt that no one type of person or mind is best, though he did suggest people who think visually may do better.

Enhancements to Philips' WP 5001

FIVE enhancements have been introduced for Philips WP 5001 word processing system. Communication facilities have been added, enabling the machine to communicate with other WP 5001 systems over the dial-up telephone and IBM and Philips mainframes. The Qume 28-inch carriage of people writing to the machine is now available. Also from Qume, the Speed-use the machine and at once is now available, and accepted notepaper to be fed continuously through a high speed printer. The WP 5001 also now offers Optical Character Recognition facilities, enabling it to handle output from any typewriter with OCR heads. Offline punching of paper tapes for text transmission is now supported by the WP 5001, enabling text to be corrected on the screen before it is committed to tape. The WP 5000 series of word processors will be enhanced later this year with the addition of a floppy disc-backed model based on the system developed by Microm, a Canadian company in which Philips has taken an 80 per cent stake (CW, May 4).



The Philips WP 5001 word processing system.

CTL adds to top of its 8000 series

A DUAL-PROCESSOR system has been added by Computer Technology at the top of its 8000 series. Called the 8070, the new machine consists of two 8080 processors tightly coupled together and is claimed to offer up to 80 per cent more power than a single 8080. It runs under the standard Modus operating system which supports concurrent multilingual transaction processing, batch and spooling from both local and remote terminals. Languages available from CTL include Cobol, Fortran IV, Basic, Coral 86 and BCPL. There is also an Algol 68 compiler, and Manchester University has developed a stand-alone Pascal which does not run under Modus.

Redifon wins £2m 'R' orders

ORDERS worth well over £2 million have already been placed with Redifon Computers for the R-range of distributed processing systems that it announced in April (CW, April 13). Customers in the UK include three local authorities.

More than £500,000 worth of the orders for the R-range have come from Czechoslovakian customers including Bastro, an engineering factory, part of a coal mining organisation in the Ostrava area; and Synthetol, a large chemical factory at Pardubice.

The local authorities which have ordered R-range systems are the London Borough of Lambeth and Rotherham Borough Council, both of which are having R300 systems with 12 terminals; and Doncaster Metropolitan Borough Council.

Versatec introduces vector to raster converter

AN electrostatic plotter can be driven by a minicomputer at full speed using the vector and raster converter, introduced by the US firm Versatec, which has a UK subsidiary at Newbury.

Berkshire. The VRC is a 5 1/2 x 19 x 20 inch box unit and has been designed to accept ordered vectors from a minicomputer and to send raster data directly to the plotter.

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The Paperless Revolution—part 1. We are using electronics more and more to store, process, transmit and display information. Will this new technology take over from paper completely? In the first of a two-part series, information scientist Anthony Cawkill looks at the latest developments that could affect our lives at work and at home.
Valves versus Transistors. Do valve audio amplifiers give better quality sound than transistor amplifiers?

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Britannia pioneers use of updating terminals

PIONEERING the use of front-office banking and pass-book updating terminals, the Britannia Building Society now has 14 branches equipped with terminals attached to Datascan D5/20 minis.

By June the first phase of the £400,000 contract, announced 18 months ago will be complete, with 48 branches, accounting for two thirds of the society's business, online to its ICL System

4/72 mainframe in Leek, Staffordshire. The mainframe is due for replacement in 1979 or 1981, and a dual 2960 is the likely upgrade, but no decision will be made for a year or so.

Datascan is in line for the contract to equip the remaining 50 branches, and the current thinking is that these will get D5/20 systems running offline during the day, with data being transmitted overnight on the dial-up network in batch.

Codex buys Toronto firm

US MODEM manufacturer Codex has gained access to the Canadian market by purchasing ESE of Toronto. ESE already manufactures a small range of modems, and this will be enlarged greatly by the Codex range. Codex will save on the 17 per cent duty which is imposed on imports if a similar product is made in Canada.

developed for the examination of alternative business strategies and is designed for use by business managers with no DP experience.

Honeywell says that with Tabol 2 it can offer across-the-board data handling services for management.

It is introduced as Honeywell takes a bigger interest in the worldwide Mark III operation with a 16 per cent share in a new company set up to sell the network (CW, June 18). GE owns the remaining 84 per cent.

NEWS IN BRIEF

ICL 2950 for patients

ONE of the earliest ICL 2950 installations is to be for Private Patients Plan, the medical insurance group which will take delivery next month. It will replace an ICL 1901T and handle the updating of company group subscriber files. ICL was chosen again because PPP is already successfully using an online system called Computer Retrieval and Entry of Subscriber Transactions which is based on an ICL 7502 terminal processor system.

Quicker delivery

NEXT-DAY delivery is now being offered by the Iden Division of Wiggins Teape for Iden carbonless paper and other Wiggins Teape products following the installation of an IBM 370/148 at its Basingstoke headquarters. The £1.25 million system will be linked to warehouse and branch office VDUs.

Footwear system

TO deal with bought, sales and minimal ledgers a Redac Executive system has been bought by Twinmar, the retail footwear company of St Albans, Herts.

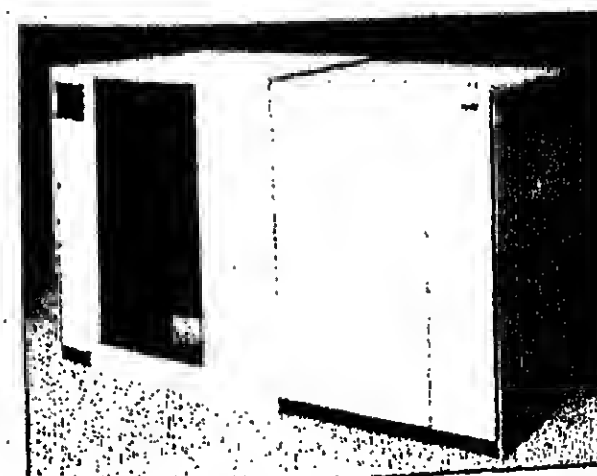
OEM disc drives

A RANGE of fixed media disc drives, the 2700 Series, has been introduced by Storage Technology, which now has an office in London. The three models in the series, the 2707, 2710 and 2720, have capacities of 33, 80 and 170 Megabytes, respectively. They are aimed specifically at the OEM market, and feature a cooling system that enables them to be used in virtually any environment.

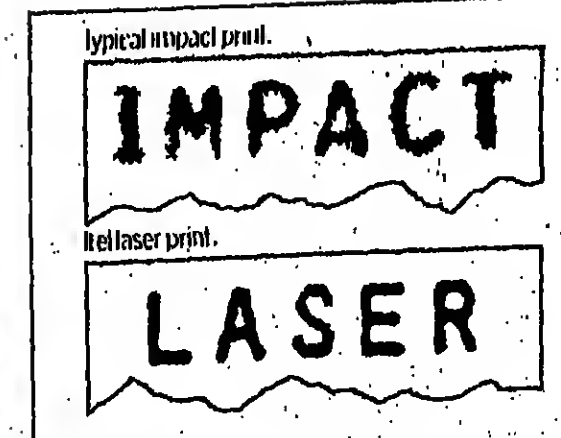
Survey research

RESEARCH into the compilation of surveys is to be carried out by a new unit at the Polytechnic of North London, with the aim of developing an integrated approach to theory and applications of surveys in the social sciences. Development of software for statistical analysis will be one of its main concerns. Among its work so far has been a national survey of schoolgirl pregnancy, and a programme of research into the "quality of life" is planned.

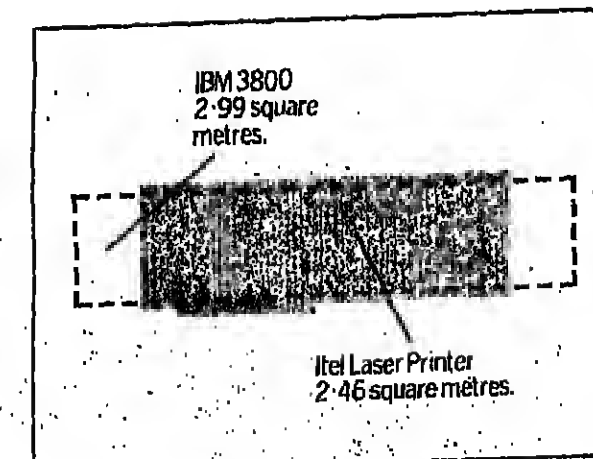
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Gaye Preston (above) of the Interdata division of Perkin-Elmer (she is secretary to UK general manager Bob Jefferson) puts her back into throwing the frisbee, and Geoff Clark (left) of Lambeth Borough Council puts on a final sprint to win the No 1 seeds heat of the men's triathlon.

Biggest turnout from S of Thames

THE brilliant sun which shone throughout the day for the South of the Thames heat of Computastars made a very pleasant day out for spectators, but a thing one for competitors, particularly the finalists.

With the largest turnout of teams so far — 28 men's and 12 women's teams — competitors were on the field much longer. To compensate for this, some events were slightly curtailed, but the final results were still announced before 7.30 pm.

Even so, the Croydon Sports Arena was the scene of some extremely varied activity throughout the day, including cricket ball and frisbee throwing, hockey-ball hitting, drop kicking, goal scoring, sack races and press-ups. In addition to the track events.

One sad omission was the hoped-for international element. Scandinavian Airlines had planned to send a team including at least some Scandinavians, but were unfortunately unable to get there in the end.

The eventual winner of the men's events was Hounslow Borough Council with 1264 points. Their team goes through to the final at Crystal Palace in September, with runners-up Commercial Union 1 and Robert Horne Computer Services, whose No 1 seed, Tony Osborn, also won the men's individual title.

Hounslow, clearly anxious to prove that their computer staff are not all brawn, also have a member of their men's team, Gary Read, in the finals of the national Othello championships. Obviously a highly talented department.

Kensington and Chelsea Borough Council, who won the Mite competition for the "best of the losers," also go through to the finals.

Hounslow Borough Council women's team, which was awarded a place in the final because the individual women's winner was a member, has been withdrawn because it did not conform to the rules of the contest. The individual women's winner is now Vei Davis of Commercial Union, the third placed team that was already in the final.

The winning women's team was Rank Organisation's first team with 87 points. Perkin Elmer, pipped at the post with 86 points, deservedly join them in the finals.



Tony Osborn of Robert Horne Computer Services, winner of the men's individual title.



(Above) Eric Mayne (left) of Perkin Elmer and Dick Holmes of Commercial Union in the final of the men's 400 metres. (Left) A close finish in the ladies hurdles final.



Liveware File

by Don

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PEOPLE

Top appointments at new Plessey company

COMBINING the operations of Plessey Microelectronics and Plessey Microsystems Inc in the US, Plessey Peripheral Systems Inc has been formed.

President of the new company is Melvyn Lapham, previously general manager of Plessey Microsystems, and Gerard Mottier, formerly general marketing manager—Europe, becomes worldwide marketing manager.

Replacing Mottier, Marcel Cornillebecq becomes European marketing manager. Michael Pringle becomes engineering support manager—Europe, and John Kishly becomes administrative manager—Europe.

A North of England sales and service office has been opened in Manchester. The manager is Duncan Hilton, until recently a service engineer with PRL.

Brian Oakley has been appointed secretary of the Science Research Council, succeeding R. St J. Walker who retires on June 30. Oakley is an under secretary at the Department of Industry and has been head of Research Division since its inception in 1972.

Nick Blake, formerly marketing director of GEC Semiconductors, has become marketing manager of Ultra Electronic (Component).

Pete Pollazzano, previously regional sales manager with On-Line Distributed Processing, has joined ICL as 1500 product marketing manager.

Jack Letherbarrow, marketing services manager of Adler Business Systems, has been appointed director of distributive network.

Ronald Hooker, a director of Dabulic which manufactures electronic components, has been appointed deputy chairman.

Trevor Homington becomes sales manager at Terminal Display Systems. Prior to this he was district manager of ADI in Birmingham.



Dave Brooks, lately of British Olivetti where he was a business systems salesman, has joined Plessey as sales executive, terminal products for the North of England.

- ### Soccer
- Division I
SIA 1. Gryphon 1
 - Division II
ICL 1. Dainalva (City) 2
 - Division III
3M 5. Airlis 2
Dainalva (W.E.) 2, 3M 2
 - Division V
Hokyns 2, CDC 3

Norprint divides into three

THE three divisions of Norprint will become three separate companies as of July 3, and these will form part of the Norcross Group's print and packaging division.

Chairman of the three companies will be Tony Warren, chief executive of the print and packaging division. The directors of the former divisions become managing directors of the new companies.

The Industrial division becomes Norprint Ltd, managing director Peter Jordan; the retail division becomes NOR Systems Ltd, managing director Maurice Wright; and the packaging division becomes Dairley Packaging Ltd, managing director Howard Marshall.

MICRO NEWS

NEB sums right for RAMS project

MUCH of the scepticism that has been voiced about the cost estimates being used by the National Enterprise Board in its planning for a new British semiconductor memory company is based on hard won knowledge.

In the area of accurately forecasting the costs involved in establishing a new production operation, the semiconductor industry has learned that estimates can easily be very wrong.

However, despite the quoted opinion of Jack Akerman, managing director of the Philips subsidiary, Mullard, the NEB investment of £50 million seems just about right for the start-up phase. Akerman has gone in record as saying that £500 million would be more like the figure required, quoting the fact that Philips alone has spent this much on semiconductor research and development.

With companies like Signetics in the US, RCT in France, Valvo in Germany and Mullard in the UK, Philips has a much wider area to spread its money than the new British company. Certainly in the start-up phase, and informed sources have indicated that £50 million could be about right.

Such a sum would be split between establishing a wafer fabrication facility capable of producing the 64K RAMs the company will be making—estimated at between £14 million and £17 million, assembly and test equipment, and research and development. These last items are difficult to forecast. Assembly is usually carried out off-shore in cheap labour areas, but with the quoted estimate of 4,000 jobs being provided to three to four years, it must be assumed that assembly will be done in the UK.

Research and development budgets inevitably require considerable elasticity, and long-term funding in this area must be an item for consideration by the NEB and the group of engineers behind the company. Given the £50 million total budget, it seems certain that much of the initial R&D will already have been done.

From this it follows that much of the production equipment necessary to manufacture the memories will be imported from the US, even though the NEB feels this is unlikely. American companies use American equipment, and research work carried out by the group in such an environment points to little of the NEB money being spent with UK or European suppliers.

There are five major "ifs" mitigating against the new company, which must be overcome almost simultaneously if it is to be successful.

Firstly, can they find the right factory? Vibration will be a problem with production processes required to resolve 1 micron lines with accuracies approaching 1 millioth of an inch. Secondly, can the factory be commissioned quickly, which involves considerable co-operation by equipment suppliers? The third concerns getting the design right first time as there will be little opportunity to start all over again. The fourth "if" is that the process must run correctly almost from day one. This may well prove the hardest, and probably the most expensive task.

Lastly, will the company be given enough freedom by the NEB to act quickly in response to the inevitable problems it will face? Although public money is heavily involved, this will probably be one company where "public accountability" could mean instant death.

As previously pointed out (14 June 8), if all these factors can be made to come good, the company will be entering a major battlefield in world semiconductor markets. Already, Motorola and TI Semiconductors have joined Mostek, Intel, Texas Instruments and Fujitsu as declared contenders, with Hitachi, Toshiba and Nippon Electric about to join the fray.

The volume price for 64K RAMs in 1982 is already being estimated at \$20 to \$22 apiece. This means that the new company will need to get its process running well very quickly, if it is to catch a major sale.

Realistic estimates of the problems this poses can be gauged from the fact that initial production yields—the percentage of useable devices from the total processed—can be expected to be under 4%. With perhaps only 10 wafers processed per hour, at least until the process is running smoothly, and with only one shift per day—production staff will need to be trained—the initial cost per good chip could be over £100. That is, unless the NEB defers a pay-back on the investment or writes it off.

IBM 'scratching surface' on micro applications

OFF-LOADING functions from the main CPU is one of the prime tasks that IBM is investigating in its growing use and application of microprocessors, and the company is only just scratching the surface.

This was stated recently by Mike Davis, speaking at a meeting of the IBCS Micro-Processor Specialist Group.

The company is already using microprocessors in its Series 1 minicomputer for its I/O attachment cards, and is finding that it can get a lot of mileage from the application. Not only do they allow the terminals connected to the I/O cards to act as remote terminals when required without recourse to CPU intervention—but they are also being employed to reduce problems in the maintenance and diagnosis of faults in the system.

As an example, he said that one problem with diagnostics was if the fault actually stopped the loading of the diagnostic routine in the first place. The I/O attachment cards in the Series 1 however, were equipped with diagnostic firmware for self checking, together with checks for the attached terminal. In this way many of the common errors (the "all-time not loaded") could be eliminated before the more fundamental parts of the system were checked.

He also said that the company saw considerable advantages in reducing the workload for user programmers in organising terminal communications. "If you split VTAM up with micros, it's amazing how flexible you can be," he said, "and you don't need 512 bytes to hold it."



Nippon bit slice and CCD

THE Japanese company Nippon Electric is spreading itself more into the high technology semiconductor market with the announcement of a 60 nanosecond, 4-bit silica microcomputer, and a second source agreement with Texas Instruments for its TMS 3064, 64K bit CCD memory.

The bit slice, known as the COM 2800 series, is said to be fully compatible with the AMD 2800 market leader, and samples should be available at around 5,000 yen (£10) next month.

The series will include a CPU chip, two types of sequencer, six types of bus transceiver and one register.

The agreement with Texas Instruments follows other second source deals in the CCD market, with National Semiconductor sourcing Intel, and Motorola sourcing Fairchild. Nippon is currently developing the Texas part, and hopes to have samples available by late autumn.

Two more user groups

TWO new user groups, one for Cromemco and the other for North Star, could be launched this week at the DIY Computer Show at London's West Centre Hotel, following meetings being planned by the companies' UK agents, Comart.

The hotel's Twickenham Room will be taken over tomorrow evening (Friday) when Cromemco users interested in forming a user group can meet at 7 pm, followed at 8 pm by North Star users.

Call for papers

THE organisers of the Third Workshop on Microprocessor Applications will be taken over tomorrow evening (Friday) when Liverpool University from September 4-5, are seeking new papers suitable for presentation at the event.

Likely subjects for inclusion will cover selection trade-offs, software design, testing, and a wide range of applications areas. Submissions should be made to M. J. Taylor, Microprocessor Workshop, Computer Laboratory, University of Liverpool, PO Box 147, Liverpool.

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Can BCS Group fulfil its potential?

THE academic image of the British Computer Society is thwarting the operations specialist group in its attempts to attract new members and so fulfil its potential.

Can the group overcome this barrier and develop into a body which will establish an accepted code of practice for operations, and provide a service of practical use to its members?

The answer is "yes", according to Barrie Patman, who is chairman of the group and a senior training consultant with BOC Data.

He is the first to admit that, since its inception three years ago, the group has hardly set the operations world alight, but he feels that it has an important role to play provided it develops along the right lines.

Dispelling the misguided view that the group is intended solely for the likes of shift leaders and operations managers Patman emphasises that "We want to recruit operations staff from all levels in order to fulfil our two main aims — to represent operations as a whole, and to upgrade the status accorded to operations by other sectors of the industry."

According to Patman, the group is concerned about such matters as the lack of job definition, and the fact that the term "operations" has a very different meaning from one institution to the next.

"At one site the operations department takes in the data control, job control and technical support functions, while at others it is concerned solely with the operation of the system."

He adds that much depends on the philosophy of the company involved, and splits installations up into three broad categories.

Firstly, there are the installations where the importance of operations is fully recognised, and where the department is allowed to use its skill, and develop the potential, that exists within its ranks.

Secondly, the exact opposite: at these sites, the programmers are held in high esteem, and the operators are considered to be just button-pushers.

In the third category, which is nothing like the other two, the installation has drifted into the situation in which it finds itself.

Operators often complain that nobody listens to their point of view. Well, Op Spot is listening, and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations.

Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 8LU. Telephone calls are equally welcome and Bernard can be contacted directly on 01-261 4036.

Discussing the difficulties faced by the group, he said, "While there is a great deal of potential in the group, it has yet to be fully tapped. Unfortunately, the members are sometimes reluctant to commit themselves to positions which will take up a lot of their time."

"But," he continued, "the greatest problem has been letting people know that we are here and that they do not have

"It is from the third category that we would hope to recruit members initially," says Patman, "for they are the ones which would benefit most quickly from being involved in the group."

"At these sites the management are perfectly willing to let the operations department develop to its full potential, but neither the operators nor the management are aware of what can be achieved."

Of the group's meetings, which are held about every six weeks, Patman says that they provide an opportunity for operations people to meet and discuss issues of common interest.

I suggested to Patman that since operations staff are often practical in their outlook, the idea of attending meetings to discuss matters is unlikely to interest them to any great extent.

He replied, "The meetings are of practical value, because members have the opportunity to 'pick each other's brains' and so save themselves the time and effort of searching for solutions to problems which others have met and overcome in the past."

But surely there are enough user groups in existence to carry out this function? I asked. Patman pointed out that the group is concerned not only with matters of a technical nature, but also those such as the recruitment of staff and the planning of shift patterns. He added that operations managers are often faced by problems in these areas and that it is often helpful to discuss them with other managers.

What has the group to offer operations, senior operators and those who are relatively new to the industry?

According to Patman, "It will enable them to put their views across and work towards creating a better situation for themselves. For new recruits to the industry it provides a means of finding out what is available to them in such areas as career progression."

He intimated that some of the established unions do not fully appreciate the problems faced by operations staff, and that it is up to operations themselves to see that standards are raised.

Discussing the difficulties faced by the group, he said, "While there is a great deal of potential in the group, it has yet to be fully tapped. Unfortunately, the members are sometimes reluctant to commit themselves to positions which will take up a lot of their time."

"But," he continued, "the greatest problem has been letting people know that we are here and that they do not have

to be members of the BCS in order to take part in our activities."

In his view, "It is time for the group to gain credibility by being seen to be doing something which is of practical use to people in operations."

In this context, it is currently compiling a "skills register," in which the combined experience of its members will be recorded. This will be circulated throughout the group to serve as a guide to those seeking advice on problems related to their work.

This is a strategy adopted by many user groups in order to "pool" experience. If a person is faced with a particular problem he is able to consult the register and contact someone who will be able to help him.

The operations specialist group has a further use for the register, as Patman explained: "Once this has been completed it will provide us with a guide as to the various needs of the group's members. We can then go ahead and produce papers on subjects which will be of practical use."

As an aid, the group is to use Standards in Operations, published by the National Computing Centre.

Said Patman: "We will set up working parties in order to carry out in-depth studies into many



Patman... "It is time for the group to gain credibility by doing something of practical use to people in operations."

of the areas which are already outlined in the publication. We will probably also be in touch with the NCC to get their views."

Throughout the interview Patman was keen to stress the practical value of the group, but in no way does he discount the importance of its academic side. He advocates that operations staff take at least Part 1 of the BCS entrance examination, for, as he says, "Part 1 of the option, and the last paper I saw had questions relating to planning shift patterns and the role of the operations manager."

He believes that by taking the whole examination operations staff will gain a much broader knowledge of the industry, which must be highly beneficial to them.

HINT OF THE WEEK

Place printers offline to avoid confusion

"VERY simple and fail-safe" is how Barry Denyer, a senior systems operator with Barclays Bank in Worthing, describes a hint relating to using printers in a direct mode in the IBM OS/VS environment.

According to Denyer, the devices should be placed in an offline state as soon as they have finished printing.

He says, "We sometimes attach both our 3211 printers to one system and use them in direct mode. To avoid confusion, we enter a very offline command as soon as the sys-

tem request for the forms control buffer has been satisfied."

At the end of each job stop, the printer is de-allocated by the system and the VARY command takes effect.

If the job requires the printer in a subsequent step, the system issues a device allocation message, with an asterisk displayed besides the address of the printer previously used.

The operator responds to the message by entering the address of the printer and it is again allocated to the job.

CDC launches Series 1 peripherals as the Certainty range

THE range of peripherals for IBM Series 1 minicomputers, expected for some time from Control Data (CW, February 23), has now been formally launched as the Certainty Series. It includes removable disc stores, fixed disc drives, a flexible disc system, matrix and band printers and an operator console display station.

The Certainty 270 line of removable disc stores provides 63, 126 or 240 Megabytes per cabinet and comes with a controller that occupies one input/output slot in the Series 1 processor.

The Certainty 230 fixed disc drive series has two models, the 10 and 20, that provide 9.3 and 18.7 Megabytes of moving head storage, respectively, while another two models, the 10F and 20F, each add 0.74 Megabytes of fixed head storage to these capacities.

A Certainty 230 drive can be loaded with the Certainty 210 flexible disc store which has a capacity of 608,208 bytes. Combined with the 230 drives, the 210 forms the Certainty 240 series of disc storage systems.

The Certainty 450 series of band printers uses a horizontal band with 384 characters on it to print at speeds of 360 or 720 lines per minute. A compressed pitch feature enables printing at 15 characters per inch instead of 10. The Certainty 420 matrix printer can print bi-directionally at 180 cps and provides compressed printing at 10.5 characters per inch.

The operator console display station, called the Certainty G10, has a mode and command structure similar to the IBM 4978 display.

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NEWS IN BRIEF

First from Montpellier

THE first French-built IBM 3032 and 3031 mainframes have been shipped from the company's plant at Montpellier, west of Marseilles. The first 3032 went to Shell in Holland and the first 3031 to the Banque de Paris et des Pays Bas in Paris.

Yves Poupon, production manager at the plant, noted that the deliveries met the schedule announced when the products were launched last autumn (CW, October 13).

Revolution

FOLLOWING its widely reported meeting on the impact of the microprocessor, the Institute of Mechanical Engineers is to hold a further conference on the "Computer Revolution," on October 18 and 19, at its London headquarters, 1 Birdcage Walk, Westminster, SW1.

Atomic contract

A CONTRACT to maintain 600 teleprinter terminals at the Atomic Energy Research Establishment at Harwell in Oxfordshire, and at the Culham, Rutherford and Atlas Laboratories has been awarded to Koda Services of Caine, Wiltshire.

Computer art dates

DATES and venues for the two of the exhibition of Harold Cohen's computer-produced art (CW, June 8) have been announced by the Arts Council. They are: until June 23, Polytechnic of Central London; South Hill Park Arts Centre, Brecknell; September 25 to October 13, Blackpool College of Art and Technology; October 30 to November 17, University of Hull; February 19 to March 9, 1979, Birmingham Polytechnic; May 5 to 27, Abbotsholme School, Uttrover, Staffs.

Water Authority goes to Honeywell

A HONEYWELL Level 68/10 is to be installed by the Northumbrian Water Authority next February, replacing an ICL 1902T system. Honeywell was one of four companies that tendered for the contract, the other three being ICL, IBM and Burroughs, although Burroughs dropped out quite early. The Level 60 system will cost about £1.5 million spread over a five-year period.

Bottled up

ROTHERHAM-BASED bottle maker, Beaton Clark, has bought a £250,000 NCR Criterion N-8450 system, which will be used principally to support the company's stock control and financial applications.

Smartie will be ready for anything in the North Sea



MICRO CONTROLS MOVEMENTS

TO meet the need for unmanned inspection equipment to operate in the poor visibility and hostile conditions of the North Sea, Marine Unit Technology has produced Smartie. The name means Submarine Automatic Remote Television Inspection Equipment.

The prototype is based on a Motorola 6800 microprocessor with 1K byte of ROM and 128 bytes of RAM. Production version will use the 6809 chip.

The micro is carried on board Smartie and controls all movements in response to commands from the console on board the mother ship. The console has a display screen. This shows the view from Smartie, which carries a low-light silicon intensified target camera and a Vidicon camera.

Driven by an electrical pump, the vehicle is supplied with power and control signals via a umbilical cord which also carries video signals back to the operator on the surface.

LEASING AND SECOND USERS

MOST third party leasees, as well as used computer vendors, have always favoured IBM machines for a whole host of reasons, including their abundance, the maintenance that IBM seldom refuses to provide, and the fact that the value of an IBM machine over a period of four or five years has always been fairly easy to estimate.

However, the rapidly falling cost of computer hardware, underlined by IBM's

announcements over the last two years of machines offering a lot more memory for less money, means that the residual value of a machine in the future can no longer be predicted with much confidence.

But far from depressing the third party leasing business, the new IBM machines have given it a boost, mainly because the rental charges on this equipment have not been changed as favourably as have the

purchase prices. IBM policy nowadays is to maximise its revenues and profits by encouraging sales.

So a third party lessor can now afford to buy machines from IBM and lease it at rates that compare well with IBM's rental charges.

In this special section on Leasing and Second Users a leading IBM customer comments on why many users are reluctant

to lease and why others take the plunge, and in another article, the crucial problem of selecting the right sort of insurance cover for a leased or second user machine is discussed.

In this opening article, Parry Mitchell, of United Leasing, outlines the history of the third party computer leasing business and gives his reasons why the future does not look too bad.

Choosing the right time for investment

By Parry Mitchell

TO BE successful in computer leasing, it is necessary to choose carefully the timing of investments. In the 360 era computer leasing companies ought to have made their major investments in 1967/68. Some did, but many continued into 1969/70 writing short period leases on equipment which evidently was about to be superseded by the 370.

I agree wholeheartedly with those who say that 370 lessors have learned very few lessons from the 360 experience.

I was a director and general manager of Standard Chartered Leasing between 1972 and 1976, and our policy during my stewardship was only to write leases incorporating a risk during the first year or two of 370 deliveries. Thereafter, with relatively few exceptions, the risk which we took on the policy was minimal. It was a policy which was difficult to maintain, particularly if one has salesmen out in the field trying to tie up apparently juicy transactions. But we stood fast and the policy which I believe was one of the best leasing portfolios in Europe.

I hold no unique position in making good decisions in computer leasing. In Europe, Leasco and Citicorp also followed a similar policy in that their leasing portfolios were put to bed during 1973/74. All of these portfolios will turn out to be exceptionally profitable for their investors.

Many leasing companies, however, have, during the last two years, written leases which incorporate high residual values on 370 processors. I think that any risk taken on equipment leases written after 1975 represents questionable judgment by those lessors, and I stand firm whether or not those lessors are protected by the safety net of the Lloyd's 'J' policy. I am also fearful for those lessors, on both sides of the Atlantic, which may have offered their customers unlimited flexibility to upgrade their equipment during the firm term of the lease.

The Lloyd's 'J' Policy was to insure investors in 370 risk leases against the equipment becoming obsolete. In effect, Lloyd's was saying to the

insured that if they were in the business of leasing IBM computers, and if they conducted their business prudently and took conservative decisions on the residual values of equipment, and if when the equipment was returned after the primary period, the insured used due diligence in the marketing of machines, and then if after complying with these requirements, the unforeseen were to occur and the 370 equipment was worthless, then and only then, would the investor be paid out.

Lloyd's has been in business for over 300 years. It has been very successful and has dealt with all manner of trading. An institution which has constantly made money out of shipping will not have the wool pulled over its eyes, and we can be certain that it is well protected against any insolvency from the parties it has insured.

Institutions such as many of the larger banks in the US, which have used the Lloyd's policy wisely, will probably never have to claim under it and the policy will have served its purpose. Unfortunately, there have been many leasing companies which have had the facility to use the policy and have built into their calculations residual values on 370 equip-

ment which are patently ludicrous.

Who will suffer in the end is open to dispute. It is true that lessees which have signed seven-year leases with a facility to terminate after three years, but subject to the provisions of the Lloyd's policy, may find themselves in trouble. Much more likely, however, is that the banks which have supplied the investment funding for the leases will find themselves obliged to offer their customers the implicit bank facility in the contract, and that it will be the banks themselves, protecting their good names, which will be totally exposed.

Fortunately for all parties concerned, the 370 computer happens to be very marketable equipment. I believe that despite the imprudence of the decisions, the equipment will endure and all the parties who have invested in 370 leasing will get their investment back, plus profit. Some of them, however, may have a few sleepless nights wondering how to market returned equipment located in warehouses at strategic airports throughout the world.

The 360 experience was interesting. In 1971/72 IBM started delivering its 370 systems and the bottom fell out of the 360 market. Machines were

stacked up in warehouses without the slightest possibility of being placed, except at very low rates. It is true that many of the companies in the computer leasing business went through cataclysmic times. Some went bankrupt, others were taken over, almost all of them had to take massive write-offs in the value of their equipment. There were exceptions like Greyhound Computer in the US, claimed to be the largest investor in 360 equipment, which has never taken any depreciation write-offs and has continuously made profits on its 360 equipment.

In 1973/74, the recession in the US caused many computer users to look again at 360 machines and this led to a firming up in the value of this equipment. It is a process which has continued and the value of 360 machines over since has declined on an arithmetic rather than a geometric basis.

If you look at the state of those 360 portfolios today you will see a very changed position. Booths Computer, my old employer, is doing very well, its 360 portfolio is written down to almost zero and is generating healthy revenues and profits. Leasco reversed its activities into an insurance company and the total operation, including its



Parry Mitchell is managing director of United Leasing.

computer leasing division, continues to generate good profits. DPF, one of the companies that was most severely affected and was close to bankruptcy, is now riding high and is a major contender in the leasing of the IBM

303X Series.

My contention on the 360 Series is quite clear. The initial investors were a little rash and a little optimistic but their marketing was good. They successfully overcame a major trough in the market, to the state where today they are now highly profitable. There was a blood bath but the army has been re-supplied and re-equipped and is now winning new battles.

So the question which now remains is, will the 370 leasing companies go through the same process? The answer is always is, both yes and no. The major investor in the 370 Series was Declimus, a subsidiary of the Bank of America. It invested in a very strong portfolio of equipment centred around the 370/156. The total value of this portfolio was probably around \$750 million. I am not privy to the structure of this portfolio nor to the length of leases, but I know the people who run the company and I am certain that it will remain profitable.

The other major leasing companies include General Electric Credit, Ito and others. Once again their strength of management, combined with diversification policies, will ensure that their operations are successful.

How your bank can help

LAST year more than £875 million worth of new equipment purchased for British industry was financed by members of the Equipment Leasing Association through leasing contracts. This compares with the figure of £288 million for 1973.

Assets currently on lease exceed £2,375 million and it is estimated that the annual value of new leases represents more than seven per cent of the total capital investment undertaken in the UK in any one year.

Not bad going for an industry which only started in the UK in earnest in the early 1960s. Prior to that leasing had been confined to such specialist equip-

ment as shoe-making machinery, copying equipment and telephone installations.

But a growing need to replace obsolete capital equipment and various periods of credit restrictions in the early sixties forced firms to look for alternative means of obtaining the use of new plant. Leasing developed as an attractive and flexible alternative.

Leasing is by no means a new concept. It was common, we are told, in the advanced culture of the Middle East 5,000 years ago. Babylonians were well used to ship leasing in 2,000 BC and early Greek culture saw leasing of slaves, mines and a factory

making sheds. The application of leasing in modern industrial civilisation has been rather less exotic but no less important. It really originated about a hundred years ago when the Bell Telephone Company and the American

Telephone and Telegraph decided to lease, rather than sell, their equipment.

This was regarded as a sales aid to equipment manufacturers as well as a form of patent protection and continued to be the most common until the 1960s.

It was then that some of the merchant banks and finance houses entered the equipment leasing field and marketed it as an additional financial service.

The basic concept behind leasing is that it enables the lessee to acquire the use of capital equipment by making payments out of revenue. It separates use of the equipment from ownership, which distinguishes it from contracts such as a mortgage or a hire-purchase agreement, where the user either has ownership from the start, or has the option to acquire it.

Cost of assets purchased for lease by ELA members - £m

Cost of leased assets owned by ELA members - £m

1973	1974	1975	1976	1977
288	321	340	421	675
761	1,076	1,426	1,669	2,376

Figure 1

Turn to page 15

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How can the user get maximum benefits?

By Des Lee

It was 10 years before I finally succumbed to the sirens of the leasing company. In the good old days when the leasing companies were named after racing animals and gin, all they needed was a friendly IBM salesman and a secondhand IBM salesman and suddenly they were in business. Sadly some went to the wall in financing deals of over-ample

proportions where others survived to evolve into the full-blown professional outfits that are evident today. Some major questions remain in the mind of the user like, "If leasing is so attractive why isn't it more popular?" "Where does the leasing end and leasing begin?" "Can the user benefit from either, and if so, how?" "What

about flexibility?" "How will my supplier react?" "What is the true cost?" By definition leasing can be compared to the "oldest profession in the world." You own it, you sell it and you still own it, because the main difference between leasing and other financial is in the simple fact that invariably you will never get to

own the item of equipment of your dreams. Of course there are exceptions but these are rare. Let us briefly examine the effect that leasing has had on the market. Because of the action of leasing companies, any new IBM mainframe announcement is bound to be a sell-out simply because every user is going to order just to grab a

place in the queue. The impact of the leasing orders had been so great that IBM now has to run a raffle to decide shipment order to users. The result of this is that a user may put in a "day one" order (in some cases day minus one) without regard to financing or benchmark performance in the hope that he or she will be granted a position in the queue. Because of this, speculation is rife over what shape future announcements will take and, more important, when the announcement will be made.

The blame, if that is the right word, for this situation must be laid at the door of the leasing companies because they can order two machines per month for unspecified delivery where you and I may be waiting for one in 12 months' time. IBM quite rightly demands a financial guarantee to ensure that their orders are not speculative but if a leasing firm's parent company happens to be a bank then it is not too difficult for it to get a guarantee, especially knowing that it is acquiring something which is bound to be highly marketable.

Thus, when the raffle takes place your own chance runs against the leasing company's 24. There are no prizes for guessing the winner. Perhaps, if leasing companies had to identify the final destinations of their machines at the time of order, like other users, then the latter might stand a better chance in the ballot for machines.

The other major impact that the leasing companies have on the market is to prolong the life of old computers, and many 360 systems are still in harness thanks to their efforts. By prolonging the active life of the 360 and the early 370 systems by purchasing them when they are due for replacement and thus maintaining a high resale value, leasing companies make purchasing a machine that much more attractive for those that can afford to do so.

What are the advantages of leasing to the user? These vary with the leasing company and the type of equipment. Naturally, it pays to shop around. By leasing you gain financial benefits, cheaper rental and no overhead rental in the case of an IBM machine. Your company's financial investment in an expensive computer can be unshackled to provide funds for other needs. You can protect against periodic price rises in rental. You can probably increase your processing capacity for the same money. In certain circumstances, you can even change equipment in mid-lease without penalties.

So what do you lose if you sign up for three, five or seven years? Flexibility, mainly. Because of the problems of getting a place in the queue if you are signed up for a lengthy period you may be caught out by the next IBM change. But after all, we are supposed to be DP professionals with three-year minds and



DES LEE has been actively associated with the computer industry since 1962, when he worked with the National Control Board on installation. After a short spell at Centre-file he joined Rowntree MacIntosh in York where his responsibilities include evaluating the RM Group's future computing needs. He is also chairman of IBM Computer Users' Association and is well known for his forthright views on the lot of the computer user.

Here, the author examines the leasing business from the user's point of view and answers some of the major questions which are likely to remain in the mind of the user.

therefore, it doesn't really matter if we don't have the latest and greatest machine sliding in our computer room because when we supposedly evaluate a machine we ensure that it is capable of performing our future known schedule, plus a little extra capacity for good luck!

Our deliberations apply equally to hardware and software and if our chosen computer was good enough before announcement, why not two or three years afterwards? The major disadvantage is the fact that in this day and age, due to technological advancement, the majority of computer hardware announcements claim to give twice as much for half the price. It is the fear of this that inhibits the user's acceptance of leasing.

For example, if you enter a lease at 85% of current rental and quickly need more capacity, and an announcement is made doubling performance for the same money, then your investment could turn out to be sour. The other fear, that of revolutionary software changes, died with the 370/155. All future announcements will be evolutionary rather than revolutionary.

Will the computer manufacturers ever put a stop to the activities of the leasing companies? I don't think they will do so intentionally because we have already established that the leasing companies have a useful role to play in today's market. However, neither will they go out of their way to protect them. One quick-fire announcement from IBM following hot on the heels of another with significant price advantages would cause severe embarrassment to leasing companies as they would be caught with expensive machines on their books and no customers. And it is likely that a few customers could be caught in the net as well, and that would be disastrous.

Who then are the ideal leasing customers? I don't think you can typify any of them because all of us who do lease do so for a variety of reasons. However, leasing naturally favours those who require cheap workmanlike computing like the service bureaux, or those who require a second machine for back-up.

What, therefore as users, can we deduce? Leasing can be risk efficient if you are prepared to risk the consequences of guessing wrong. Leasing favours those with growing workloads and with static applications. It can also provide cost effective upgrades in light financial situations or a cheaper solution to a back-up problem.

Tip-toeing through insurance minefield

By Alwyn Farey-Jones

IBM's insurance clause in its rental agreements is a model of an insurance policy. It is only one sentence long and indemnifies its customers against all risks of physical loss or damage to the machinery, rather than caused by nuclear reaction.

When you purchase or lease you have to organise the insurance yourself. This needs careful thought by both data processing and insurance management.

Unfortunately, most insurance policies are not as simple as the IBM clause, they often contain exceptions. You have the responsibility of setting a value to the equipment yourself, and your contract with the insurers will be set in a legal background which many would regard as being heavily weighted in favour of the insurer.

It is most important to relate the insurance contract to the maintenance contract and other contracts with IBM. Don't forget you will now have two parties to deal with, not just IBM. You must consider the possibility that IBM will say "that is an insurance claim" and the insurer will say "that should be fixed under the maintenance agreement."

IBM's contract says that you must have a stable power supply, so it is important that the insurance contract doesn't exclude "electrical disturbance". Nearly all policies will exclude damage due to withdrawal of power supply by industrial action if warning is given, but many exclude even unexpected withdrawal of power. Sudden power surges or damage caused by out of sequence power down are a substantial cause of computer damage.

Beware of any exclusion for derangement. Although the manufacturer will mend a machine that goes wrong, a derangement exclusion opens the way for argument between the

manufacturer, the customer and the insurer.

So does an exclusion for defective design or manufacture. I know of one major bank which spent 15 months pursuing unsuccessfully a claim against its insurers for damage to ferrite rings in a 360/45 memory. The insurers rejected the claim on the grounds that it was either a derangement or the design was defective. Under insurance law, the onus is on the insured to prove his loss, not on the insurer to show grounds for the rejection of the claim. In the end the bank swallowed the cost of the new memory plane itself.

Other exclusions to be careful of are fire negligence, especially if there is a derangement exclusion as well, short-circuits and inductive effects.

What sum assured should you set for your equipment? Will your insurance policy re-insure as now? If so the sum assured should probably be the new list price. Perhaps you are happy to receive a second user replacement? Indeed, for availability reasons, you may need to accept a second user replacement machine anyway. If so, perhaps the second user price may be the correct sum to insure, not necessarily.

Take care that you and your insurer are of one mind. The situation for replacing a total loss is clear. However, unless you have a specific agreement the insurer may downgrade the claim paid for partial damage in the proportion that the sum insured bears to the value as new by the application of what is known in insurance jargon as average.

Average causes more ill-feeling between the insured and the insurer than any other single doctrine, so it is worth explaining it from the insurer's point of view. Let me give a simplified example.

Supposing in a certain year, an insurer insures 1,000 new computers each worth £500,000

Buying or leasing a second-hand IBM system? In this article Alwyn Farey-Jones, managing director of Computer Insurance Ltd, gives a timely warning to remember to take full account of the insurance aspect.

Unlike when an IBM system is rented with its "catch all" insurance clause, buying or leasing means that the user must arrange its own insurance. And this is where the problems start. Farey-Jones gives a guided tour through the minefield and concludes by urging all DP managers to pick brokers who know about computers.

at a rate of .15%. The total premium is £500,000 x 1,000 x .15% = £750,000.

Now suppose his loss experience for the year is typical and the cost of repair with new parts and manufacturer's labour costs are:

1 loss of £300,000 =	£300,000
2 losses of £100,000 =	£200,000
8 losses of £25,000 =	£200,000
Total	£700,000

This leaves him an underwriting profit of £50,000 for the year.

Now what happens if five years later, all his clients reduce their sums insured by half to £250,000 each to reflect the second user value and thus reduce the total premium paid to the insurer to £375,000?

There is no difference in the risk conditions themselves due to the decline in value of the computer, so let's assume the same loss experience. Let us ignore inflation and assume that equipment repairs cost the same as before.

Now if the insurer pays out the costs of repair as now in full, apart from the biggest loss which is now treated as a total loss and replaced with a second-user machine at £250,000, then the total losses for the year are only £50,000 down to £250,000.

The total premium, though, has been cut in half to £375,000, the insurer has an underwriting loss for the year of £275,000.

The standard way round this difficulty for the insurer is for his

policy to be subject to average, which means that if you pay only 1% of the premium for full re-insurance you will be paid only 1% of any claim.

The implication of this is that your broker should present to the insurer both the new replacement cost of the machine and the second user value and get a rate agreed that will pay partial loss claims in full, but consider any claim in excess of the second user value a total loss at that value.

If you are the user of a machine purchased or on third party lease new from IBM, you can still insure for market, ie second user value. In that case, there is an important discussion you should have with IBM — in the nice language of which IBM is a master — about whether "marketing support" would be available for a new machine if you replace with a second user machine after an insurance loss.

If your computer is acquired on a lease it is possible that after a loss, you are still required to pay lease rentals in excess of what you would otherwise expect as the insurance value of the machine. This also needs to be reflected in your insurance cover. (You have this obligation if the loss is your fault even under an IBM rental contract, as this liability is reflected in your insurance cover.)

This article is about the insurance of second user machines so I will, only briefly, mention consequential loss insurance which is applicable to new or used,

purchased, leased or rented machines equally.

A message that has come through to us from our claims case study file is that the time taken to recover from a loss is generally greatly underestimated. Even if it is possible to arrange standby from another site for a modern database/data communications system at all, the sheer length of time involved can be enormous.

Computer departments are increasing their importance year

by year as the nerve centres of their enterprises. The effects of damage to a computer centre should be the subject of very special analysis by the DP department, the insurance department and line departments, perhaps with the aid of a specialist adviser.

Choose an insurance broker that knows insurance, knows computers, knows the computer market place, knows the manufacturer's contracts, and you won't go far wrong.

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How your bank can help

From page 13

Under a leasing contract, therefore, the lessee has possession and use of a specific asset on payment of specified rentals over a period, while the lessor retains ownership.

Furthermore, the asset is chosen by the lessee not the lessor (as distinct from straight hire purchase, see Figure 1, page 13). One obvious advantage is that leasing involves no charge on capital and the use of plant and equipment can be obtained without a capital outlay. Assuming that the need for the asset has been established, the income generated by its use may well be sufficient to meet the series of rentals so that the commitment is self-liquidating.

Another advantage is that by fixing in advance the amount and regularity of the rental payments it helps considerably with cash flow forecasting and focuses the lessee's attention on the true cost of the asset over the expected period of use.

Once the period of the lease is completed the separation of use from ownership can lead to clearer thinking on any replacement decision and weakens that

able advantages over other methods of obtaining new capital equipment. But any leasing company will tell you that the first thing to do in to make sure that you are choosing the right piece of equipment and only then fully evaluate the pros and cons of leasing against other forms of finance or outright purchase. See Figure 1, page 13.

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school which inclines to sticking to out-dated equipment.

Leases are also flexible and stable. They provide a medium-term facility which is not readily available elsewhere and most of them are negotiated on tailor-made terms between the lessors and the lessees.

Williams & Glyn's Leasing, for example, recently negotiated a lease for a major chemicals plant which took two years to complete. The lease was for a period of 10 years, with a 5-year option to extend. The lease was for a period of 10 years, with a 5-year option to extend. The lease was for a period of 10 years, with a 5-year option to extend.

In other words the lease rental payable matched the cash flow profile generated by the plant.

The manufacturer too can rent assured that the fixed nature of a lease contract, once it is agreed, applies to the lessor as well as the lessee. The facility cannot be withdrawn or curtailed in the event of a credit squeeze or changes in economic conditions.

Since its establishment in this country some 18 years ago, leasing has earned for itself a permanent place as a distinct financial facility which is now part of the financial mix of most progressive companies.

All the "big five" clearing banks (together with the main Scottish banks) have established a direct leasing subsidiary and most of the major merchant banks offer a leasing service.

Although government policy — through the introduction of tax allowances and grants — has played a significant role in the development of leasing, its future existence is not conditional upon the continued availability of such incentives; provided a lessor continues to be treated in the same way as any other purveyor of capital equipment.

As long as there is a need to finance capital expenditure, leasing will continue to play its part and over the next few years the leasing industry is expected to flourish.

Prepared by Williams & Glyn's Bank

Tim Palmer reports on the latest developments from Wang in the US

Starting off in scientific calculators, Wang Laboratories has grown fast by moving into the low-cost small business and word processing markets. A \$200 million company today, Wang has ambitions to hit the

\$1,000 million mark by the mid-1980s and is gambling on a powerful new product, the 2200 VS small mainframe to carry it there. Tim Palmer reports from corporate headquarters in Lowell, Massachusetts.

The hungrier firm that aims for \$1,000 million sales

THE hungrier computer company. That's what Wang calls itself. And that hunger manifests itself in a number of ways, notably a hunger to get its name as well known as that of IBM. This is not without reason, because Wang's achievements in the computer industry have gone too much unnoticed.

But while the world at large has been looking the other way, Wang's customers have shown a loyalty to the company and its products which has carried it from an \$8.8 million company in 1966-67 to \$134 million in 1978-79.



Why WP system has no CPU

Koplow... we are working towards interfacing the word processing system to our computer line.

PERHAPS the most noteworthy feature of the Wang word processing system is that it has no central processing unit. Instead, it takes the concept of distributed processing to its logical conclusion by distributing all the intelligence through the elements of the system, so that for example the basic WP10A stand-alone system includes Intel 8080s in the video terminal, the dual floppy disc unit and the printer. The line is exceptionally easy to upgrade, being simply a set of 8080-based peripheral modules. The WP20 takes up to three workstations and three printers, the WP25 adds hard discs of 1.5, 2.5 or 5 Megabyte capacities and the WP30 has 10 Megabyte disc and supports up to 14 peripherals.

As with the VS, the WP systems include 16 function keys on the keyboard for operator prompts and menus from which the desired operation is selected. Automatic document indexing and compilation of document statistics is supported, and the latest release of the software supports variable letter spacing.

Additional peripherals supported include optical character recognition, photo-composition and intelligent copiers.

At present only one floppy disc terminal is supported, but local floppies at each terminal are to be introduced. "We program in PL/M and an assembler, and compilation takes four to five minutes on a native machine," said Harold Koplow, head of word processing research and development at Wang.

"We are working towards interfacing the word processing system to our computer line to offer an integrated system."

Koplow is an enthusiastic believer in the "office of the future" in which most of the operations done manually today are automated, word processors telephone lines and videophone conferencing between people thousands of miles apart are an everyday event.

He is also enthusiastic about the social impact that word processors are having at Wang.

"We use our systems intensively in-house," he added. "Former secretaries now either operate word processors or become administrative assistants, and as a result, we now have far more women managers in Wang."

At present, main memory is limited to 512K words, and disc storage extends to four 25 Megabyte drives, giving total online storage of 2,300 Megabytes.

With the VS targeted squarely at IBM, it is not surprising that

Architecture changes for virtual processor

THE new virtual 2200 VS processor from Wang marks a major departure for the company, taking it way up-market from its traditional business in the \$10,000 to \$30,000 segment.

Due for UK launch in July, the 2200 VS processor is completely different from the 2200 T and VP systems. The T is built around a Basic Interpreter and has no operating system as such. It has a 24 bit microword, 4 bit data path and 8 bit fetch from memory. The VP, and its multi-processing MVP variant, have the same 24 bit microword, an 8 bit data path and a 16 bit fetch from memory.

One thing at least the VS has in common with its predecessors: an unconventional architecture.

"Internally the VS has a 16 bit architecture, with an additional six bits of error correction code, but externally to the programmer it is a 32 bit machine," said Peter McElroy, product manager, large computer systems.

The operating system is interactive, with copious prompts to the user. "It has a VSAM-like indexed access method, the main difference being that IBM splits blocks on overflow, where we create new blocks."

"The file management system supports an optional record format compression which in one example compressed 34 Megabytes into 22 Megabytes. Decompression is handled by the input-output processor."

The interactive keyboard includes 16 two-function keys and the processor is interrupt-driven from the work station. Detailed chunks of text appear on the screen or operator in a protected field, and McElroy was convinced that programmers using the VS have no need of pencil and paper. For debugging, a symbolic facility puts up five lines of instructions on the screen, with the one that failed in the middle line.

Target areas for the VS are the large IBM System 3 base and 370 users who are in need of more power and want an interactive system. It supports one background batch stream plus spooling, and batch jobs can be run from the terminals.

"The VS is four to five times faster than the IBM System 3 at about half the price."

The minimum system costs \$38,000 for a 64K byte processor with 10 Megabytes of disc, one input-output processor, 200 character printer and the operating system. At the other end of the scale, a fully configured VS with 512K bytes of main memory can cost \$500,000.

In the UK the VS is due to be launched at the beginning of July, and Reg. Broughton, who has been appointed manager of the product, has been visiting Lowell to write software for it.

"We have bases in London, Rugby and Harrogate but we will be selling the VS just out of the London office to start with, for three large configurations up and running with customers."

"In all we have about 150 people in the UK and will do £7.8 million this year; this would be an improvement of about 70% over last year."

The languages chosen for the machine include ANSI-74 Cobol, and RPG II enhanced for interactive working. Wang claims that the most interactive IBM Cobol programs need little or no conversion to run on the VS, and that the same applies to RPG II programs from IBM's System 3 line. Other languages are Basic, Macro-assembler, and a procedure language. Perhaps the best selling point for the VS is the extent to which it is designed to improve the productivity of Cobol programmers.

"Our user with two VSs running TSO asked to do all his programming for his 2200 VS, claiming that he was getting a consistent 25% improvement in productivity," said McElroy. "But we discourage this because it limits the user to a common subset of our Cobol and IBM's Cobol."

There have been many other innovations in the computer industry since the 1950s, but they are only now being developed as a result of the convergence of these technologies, and as such are primarily responses to commercial and other social pressures.

The tendency towards distributed processing, and distributed databases, for example, has its main cause in the "revolt of the user," to quote accurately, the response of local management to the loss of power to the corporate centre. The ability to produce physically small computers, or to generate new concepts of database handling via secondary importance.

Looking ahead to the use of computer and communication technologies in the year 2000, and assessing their effect on people's lives has little to do with cataloguing recent inventions, or even extrapolating trends in computer or terminal use. Like

By JOHN GARRETT

It is far easier to look back on technical change than look forward. Looking back we can see the part of a far broader history, and are able to identify social and economic processes that caused one technology to develop, and another to fail.

Looking forward, particularly in a world as politically fluid as our own, with people's aspirations so varied, is a lot more difficult. Yet what the world makes of the two, and only two, great technologies developed by the computer industry will be decided by the social ideas and economic forces that will gain prominence.

The two technologies, which I take to be digital information (memory) and machine intelligence (processing), have been refined over a period of 20 years, to such a degree that:

1 All kinds of information, from music to X-ray pictures to an individual's complete life history can be digitally recorded, thus making all known data capable of being processed by computer, and being rapidly and universally communicated.

2 Machine intelligence is now cheap enough to be applied to a huge and still-growing range of decision-making activities that could previously only be performed by humans, or more interestingly, were beyond human scope altogether.

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messages, shopping, even medical and legal consultations. On a political level, viewpoint services, if as widely distributed as television today, make referendum and other direct forms of democracy far more feasible. Many of the arguments against these forms of democracy, such as the technical problems in consulting all the people and the previously restricted availability of background information, will lose much of their relevance.

The advances of computer and communication technology are thus relevant to many different groups and interests in society. How, in practice, they will be used has very little to do with the creators of computer systems — their work has been done. The hardware and software designers have performed the role undertaken by the Guild craftsmen before the

Third prize in the Computer Weekly/Dataskil essay competition, Computer-style 2000, was awarded to John Garrett (left) of Computer Systems International, of London WC2. When he submitted his an-

try, Garrett was a project leader with the company, but has now been promoted to project manager with CSI's American subsidiary, Computer Systems Development. His prize-winning essay appears below. The entries by John Finnie of Solihull, Paul Holden of Dublin and Tony Thornton of Derby, which have won special awards, will be published in Computer Weekly in the near future.

By the year 2000—a divided society based on nineteenth century ideas

likewise will attempt to build more complex socio-economic models which after a further 22 years of program testing, they may even get to work. On a more serious note, the use of such models, with access to the vast quantities of social data available to the modern industrialised state, could prove a major threat to visible government and democratic decision-making. Such models have already been used for far more than forecasting; indeed the ambitious objective of one was the complete control of production, fiscal policy and development in a developing country.

Stuffed here described this system which has developed for the Allende government in Chile as a "system of here-and-now management of the economy" that is now based on historical records, but on an immediate awareness of the state of affairs and the projection of that future.

To be effective, such models will take what they consider as corrective action, or in Beer's language, "algorithmic feedback," in advance of any popular desire for change, or indeed appreciation of a problem. The role of popular decision-making, particularly on the local level, is thus greatly reduced.

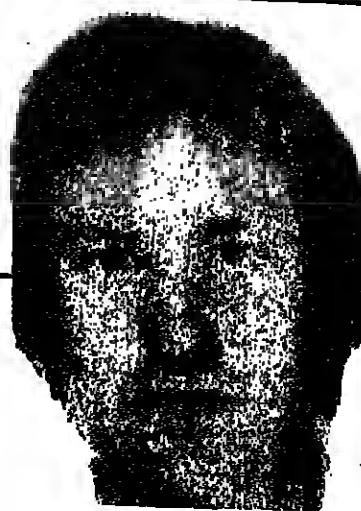
Advances in the capabilities of computers as well as developments in communications make such real time control by a government over an economy and its people feasible for the first time in human history.

Computers, fortunately, are not all on the side of the big battalions — the emergence of the microprocessor has seen to that. Personal computing is unlikely to be content for long with housekeeping jobs and TV games. The use of microprocessors in numerical control machines gives a small engineering concern a vastly increased scope for producing a wide variety of components from relatively few machines. Craft skills such as embroidery or pottery could be enhanced by use of micro-controlled sewing machines or pottery wheels.

The microprocessor, or rather cheap processing, will enable small enterprises to fill the wide gap between mass produced goods on the one hand and the craftsmanship on the other. Multi-purpose computer-controlled machines could at last make the production of small batches of goods an economic proposition.

With regard to information and communications technology, the citizen could benefit enormously from the vast public database available through viewpoint services. In addition to information, these services could handle routine financial transactions, sending personal

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The microprocessor, or rather cheap processing, will enable small enterprises to fill the wide gap between mass produced goods on the one hand and the craftsmanship on the other. Multi-purpose computer-controlled machines could at last make the production of small batches of goods an economic proposition.

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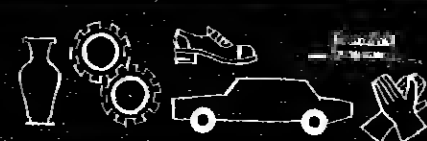
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WEST MIDLANDS
GAS

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The recent large order from Saudi Arabia has confirmed the position of Philips as one of the world leaders in the supply and manufacture of computer controlled telephone exchanges. This, plus enhancements and additions to the range of switching systems, coupled with the current rapid expansion of the department, has created vacancies within the U.K. part of the international development team working on these systems. The U.K. base for this effort is Malmesbury, Wiltshire where the laboratories of Philips Telecommunications and Pye TMC are located. The development effort extends into the fields of space and time division switching systems, local end trunk applications, integration of microprocessors, and network management centres.

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your kind of jobs,
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Staff Services Division of BOC Datasolve Group and
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Excellent opportunity with career potential.

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Contact: Jim Baker

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Contact: Mike Creamer

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If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

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PROCESS CONTROL & TELEMETRY
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BASIC SOFTWARE

An office is now being opened in Manchester to serve clients in the North.

Applicants should have a good understanding of real time systems and a sound knowledge of at least one microcomputer or minicomputer. For senior posts proven systems design capability is essential and project leadership experience would be an advantage.

Members of the company should write to, or telephone Mr. M. Griffith giving details of experience.

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Most of our people are now working on a new challenge and opportunity for the future. Are you looking for a new challenge? Are you looking for a new challenge? Are you looking for a new challenge?

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Over the last year, for example, we've spent £400,000 on additional hardware, and we're spending £800,000 more in the year to come. We are investing in a large PDP-11 based Data Communications Network and in-store EPOS systems to supplement our new Mainframes.

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Cedric Hopkins - Computer Services
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If you prefer, write giving brief
career details to Cedric Hopkins
at Fins Fara Ltd., Gals House,
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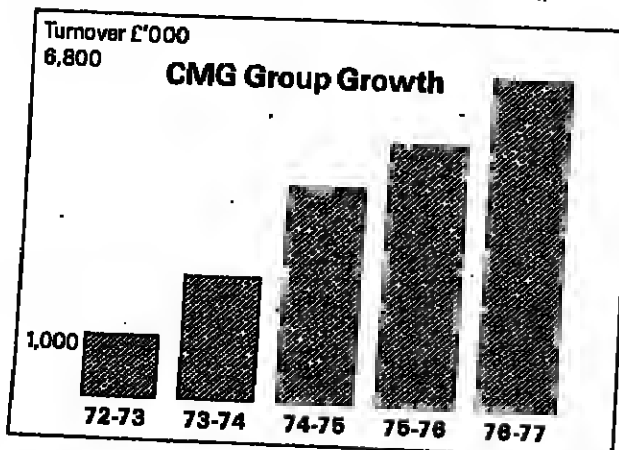
The work is varied and interesting. For example, writing JCL to improve the effectiveness of systems from an operating viewpoint. Taking responsibility for library maintenance. And providing operations support during the implementation of new systems.

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OFFICE/CONTACT

DATE OF BIRTH

MARITAL STATUS

NATIONALITY

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DESCRIBE THE APPOINTMENT YOU NOW SEEK:

DETAILS OF EDUCATION

SCHOOL CAREER

EXAMINATION RESULTS (subjects and dates)

HIGHER EDUCATION

EXAMINATION RESULTS (courses and dates)

CAREER HISTORY

PRESENT OR MOST RECENT EMPLOYMENT

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JOINING SALARY £

CURRENT SALARY £

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NAME OF COMPANY

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JOINING SALARY £

CURRENT SALARY £

POSITIONS HELD (approx. dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

OTHER INFORMATION -

LEISURE, COMMUNITY ACTIVITIES, etc:

ANYTHING ELSE YOU WOULD LIKE TO ADD:

SIGNATURE

DATE

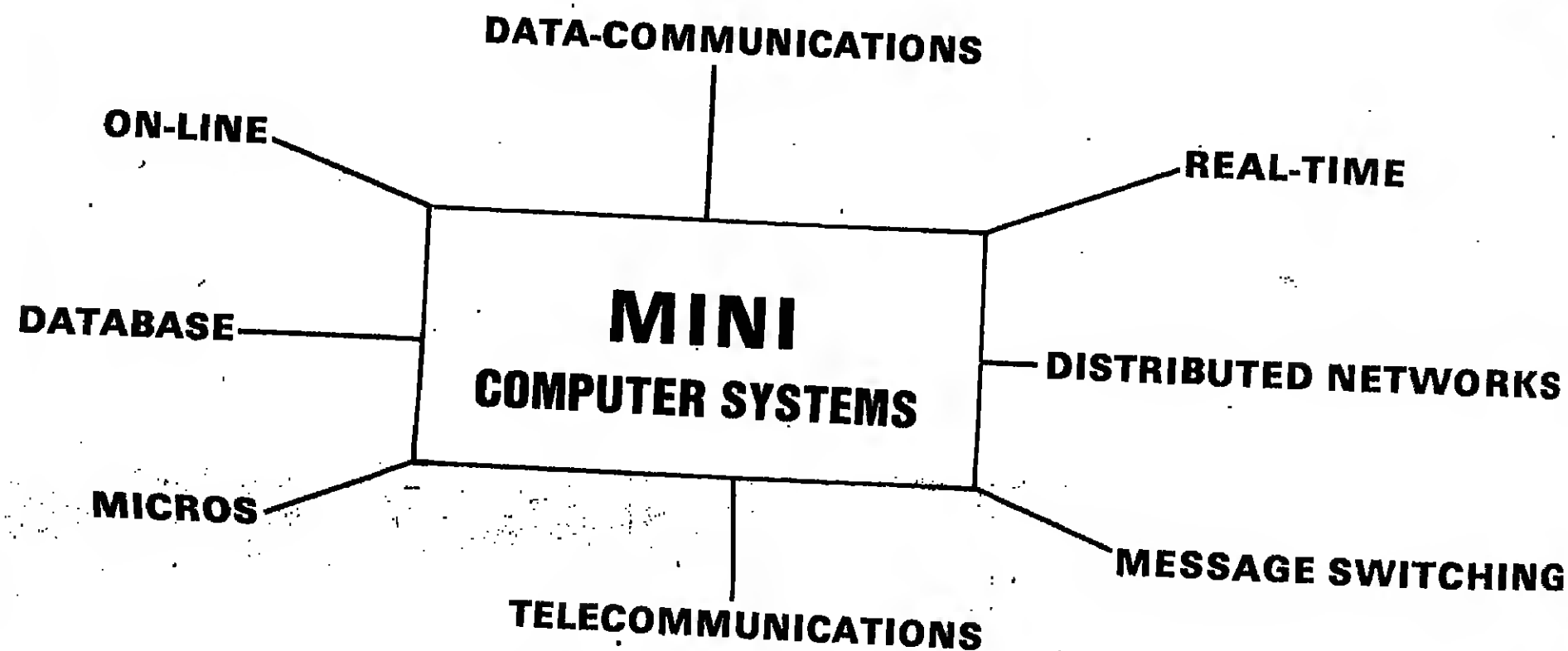
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Programmers, Analyst Programmers
Consultants, Senior Consultants

HOLLAND £9,000-£16,000

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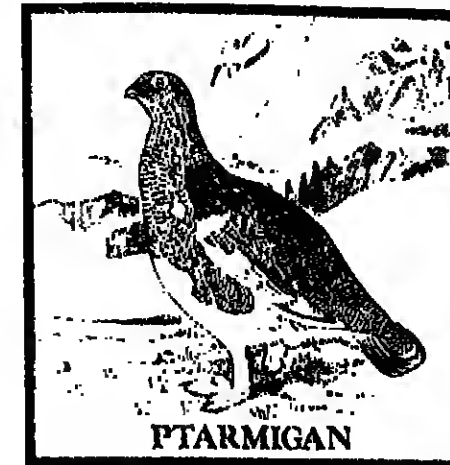
Contact us at your earliest opportunity to discuss in more detail the opportunities available to you. We shall be arranging interviews for you to meet the client in London during the next two weeks.

Bill Seymour 01-637 5001

U.K. Office, Portland House, 4 Gt. Portland St., London W1N 5AA
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The success of the teams working on this project depends on the development of people with the necessary drive to match the many career opportunities available.

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Are you currently working on	Have you held a position as a	Are you interested in	Are you capable of working on	Have you had experience with
<input type="checkbox"/> 1600	<input type="checkbox"/> 1. Design	<input type="checkbox"/> 1. Analogue/Digital Systems	<input type="checkbox"/> 1. P.I.	
<input type="checkbox"/> 1800	<input type="checkbox"/> 2. Development	<input type="checkbox"/> 2. VLSI	<input type="checkbox"/> 2. Telecommunications	<input type="checkbox"/> 2. IP/2100
<input type="checkbox"/> 1850	<input type="checkbox"/> 3. Testing	<input type="checkbox"/> 3. Microprocessors	<input type="checkbox"/> 3. Interrupt/Interrupt	<input type="checkbox"/> 3. PDP11
<input type="checkbox"/> 1850	<input type="checkbox"/> 4. Maintenance	<input type="checkbox"/> 4. Hardware/Software	<input type="checkbox"/> 4. Loop/Control	<input type="checkbox"/> 4. 8080
<input type="checkbox"/> 1800	<input type="checkbox"/> 5. Training	<input type="checkbox"/> 5. Software/Software	<input type="checkbox"/> 5. Device Handlers	<input type="checkbox"/> 5. P1000
<input type="checkbox"/> 1800	<input type="checkbox"/> 6. Project Management	<input type="checkbox"/> 6. Hardware/Software	<input type="checkbox"/> 6. Diagnostic Software	<input type="checkbox"/> 6. Real-time Systems
<input type="checkbox"/> 1800	<input type="checkbox"/> 7. Quality Assurance	<input type="checkbox"/> 7. Software/Software	<input type="checkbox"/> 7. Software/Software	<input type="checkbox"/> 7. Low Level Languages
<input type="checkbox"/> 1800	<input type="checkbox"/> 8. Other	<input type="checkbox"/> 8. Software/Software	<input type="checkbox"/> 8. Software/Software	<input type="checkbox"/> 8. ACP/1000
<input type="checkbox"/> 1800	<input type="checkbox"/> 9. Other	<input type="checkbox"/> 9. Software/Software	<input type="checkbox"/> 9. Software/Software	<input type="checkbox"/> 9. COBOL
<input type="checkbox"/> 1800	<input type="checkbox"/> 10. Other	<input type="checkbox"/> 10. Software/Software	<input type="checkbox"/> 10. Software/Software	<input type="checkbox"/> 10. FORTRAN
<input type="checkbox"/> 1800	<input type="checkbox"/> 11. Other	<input type="checkbox"/> 11. Software/Software	<input type="checkbox"/> 11. Software/Software	<input type="checkbox"/> 11. FORTRAN
<input type="checkbox"/> 1800	<input type="checkbox"/> 12. Other	<input type="checkbox"/> 12. Software/Software	<input type="checkbox"/> 12. Software/Software	<input type="checkbox"/> 12. FORTRAN

Interviews will be held in the premises of Southern England, where a selection of suitable candidates will be interviewed.

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We would have thought they'd relish the chance to work on equipment which is at least as big as they are. For instance, an IBM 360/50 with a megabyte of core operating under OS MVT and HASP with access to three IBM 370/158's operating under MVS/JES2 with TSO, CICS and VSPC. We were puzzled and took our aggression out on the tea lady. She didn't flinch. A steadier hand has never poured tea. Raising a world weary eyebrow as steam cascaded around her, she ad-libbed quickly. 'Have you advertised?' she asked. 'Fakes the cake doesn't she?'

Senior Programmer - up to £7,500 p.a.

With an in-depth knowledge of COBOL, together with an understanding of OS/JCL. Up to 4 years' experience of IBM equipment required, together with some experience of controlling junior staff.

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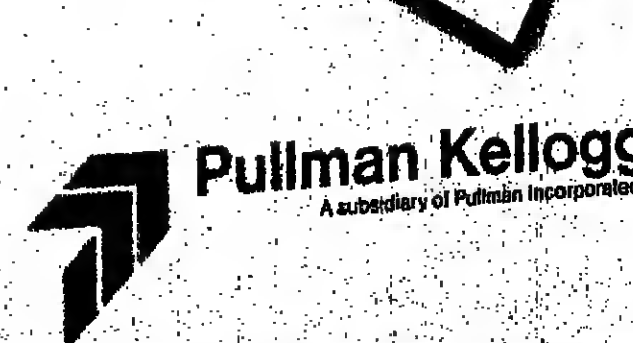
IF COMPUTER PERSONNEL ARE AS BIG AS THEY THINK THEY ARE HOW COULD THEY BE SO HARD TO SEE?

If you are big enough, dial 01-903 8484 and speak to us about our equally big opportunities. We will be able to arrange an early interview.

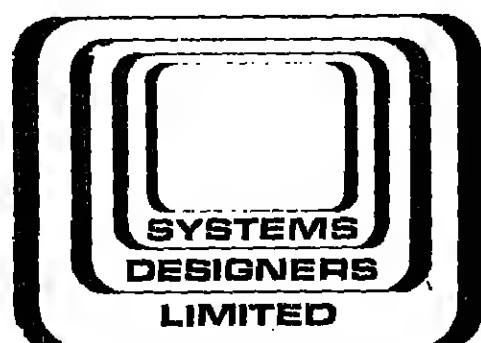
Call anytime between 9 a.m. and 7 p.m. on Friday 23rd June, Monday 26th June or Tuesday 27th June. Ask for John Staerck on extension 3850 for the Senior Analyst and Graduate Programmer positions and Ian Kydd on extension 3865 for the Senior Programmer and Programmer positions.

If you are unable to make any of these times please call John Nicholas on extension 3159 in our Personnel Department.

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هذا من العمل



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★ ENGINEERS
★ PROGRAMMERS

UP TO £8,000

Located at Frimley, Surrey, Systems Designers Limited is an independent British systems consultancy with an unrivalled reputation in real-time, military and industrial systems and basic software research. Established in 1966, and currently 180 strong, the company is expanding its operations in both the UK and Europe. A full order book and continual demands for our high quality service have produced an immediate requirement for a number of professional Consultants, Engineers and Programmers. Current projects are challenging and rewarding, and opportunities exist for rapid progress for top people.

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Consultants and Engineers required up to £9,000.

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Projects in the fields of process control, production monitoring and control and data logging require experienced staff, with PDP 11 and associated software experience of particular interest.

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Please write initially to Bill Hockey, Systems Manager, SYSTEMS DESIGNERS LIMITED, 57-61 High Street, Frimley, Surrey GU16 5HH or telephone Camberley (0276) 63471.

Computer Systems & Operations Managers

Western Australia

AUS \$19,000 plus

Our Client is the world's largest producer of alumina, their corporate computer centre in Perth, Western Australia has installed an IBM 370/145 and will install a 2MV3031 in October 1978 operating under VM 3700 SVSI DOS/VS and using IMS DB and DC to provide on-line and RJE facility to all the company's major locations throughout Australia.

To complete the installation on their new system and continue its further development, the following are required:

SYSTEMS DEVELOPMENT MANAGER who will have complete responsibility for the planning, development, implementation and maintenance of commercial systems throughout the company. Applicants should be graduates or have an equivalent professional qualification with at least 10 years experience in data processing. They must have had recent experience at a senior level of large scale on-line data based project development using IBM hardware and software.

OPERATIONS MANAGER to manage the corporate computer centre and control the company nationwide data transmission network. Applicants should have had 10 years experience in data processing operations

including some systems programming and systems analysis. They should have managed an installation of comparable size where new hardware and software was being installed and developed. Salary for both appointments will be negotiable and will provide an excellent standard of living. All interviews will be held in Great Britain.

OUR CLIENT ALSO OFFERS

- a well planned appointment offering scope for a good deal of personal satisfaction
- a challenging work environment
- personal security
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For an application form write or telephone in confidence to Geoffrey Laycock at the address below, telephone 01-229 6742 quoting reference C/887/10W.

Urwick Dynamics Limited

2 Kingsway, London W2 2 1

Computer Programmers

We have vacancies for Computer Programmers at the Atomic Energy Research Establishment, Harwell and at Culham Laboratory.

HARWELL - IBM 370 COBOL

The work will be centred on accounting procedures including on-line applications using TASKMASTER. Applicants should have had experience in writing programs in COBOL, preferably for IBM 370 under OS/VS 2, and experience of ASSEMBLER and telecommunication networks would be advantageous.

CULHAM - ICL 4/70 ANSI COBOL

The work will be centred on accounting procedures in a Database environment using IDMS, and we envisage the development of on-line teleprocessing applications.

Experience of Database techniques, particularly IDMS, would be advantageous. Starting salary will be between £2727 and £4019 depending on age.

Further details and application form from: D. G. Catar, Personnel Department, A.E.R.E. Harwell, Oxon, OX11 0RA. Tel: Abingdon (0235) 24141 Ext. 2059.

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Portsmouth Polytechnic

Research Assistant

to work on the solution of mathematical problems in chemical and enzyme kinetics.

Applicants should possess an Honours degree in Mathematics, Chemistry or Physics. Experience in computer programming will be a considerable advantage. The person appointed will be expected to register for a higher degree.

Appointment is initially for a period of two years. Salary scale £2589 to £2843 per annum.

Application forms and further particulars from the Staff Officer, Portsmouth Polytechnic, Alexandra House, Museum Road, Portsmouth PO1 2AQ, to whom completed applications should be returned by 28th July, 1978. Please quote ref. D48.



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Our Client, a major manufacturing organisation is seeking a dedicated staff to be actively involved in the company's present expansion plan with D.P.

You will join a project team involved in a variety of commercial systems representing a stimulating and challenging environment for people wishing to extend their applications knowledge.

Successful candidates will have at least one year's experience of either COBOL or PL/1. The Analyst/Programmers should have been involved in the implementation of at least one large commercial system.

The Company is very conscious of developing employees' skills and award them with a secure future and career progression. Apart from competitive salaries and four weeks' holiday, other attractive employee benefits are also provided.

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SURREY To £7,500
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The demand for mini computer systems has accelerated so rapidly that our client requires D.P. professionals at all levels to develop and install total systems based on mini/micro equipment. Hardware procedures for the first time. Applicants seeking to progress their careers within an exciting environment should be experienced in one of the following:

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 - * Advanced Project Control Concepts
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Applicants with 2-3 years' COBOL experience will be offered an excellent commencing salary enhanced by Pension Scheme, 4 weeks Holiday, Staff Restaurant, Social Club and if necessary removal expenses.

24-hour answering service
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01-353 0981

Reckitt & Colman Limited

U.K. Leisure Division
Systems Analyst
C. £6,500

The newly formed Leisure Division of Reckitt & Colman Limited is based at Winsor & Newton Limited in Wembley, Harrow, Middlesex. The Division is mainly involved in the manufacture and supply of art and craft materials and includes the world famous names of Winsor & Newton, Reeves, Dryad and Charles Page.

A Systems Analyst is required to work on a complete review of all systems in the operating companies. A minimum of two years systems experience is required, but the ability to work on own initiative and liaise at all levels within the division are of paramount importance. There will be deep involvement in projects from feasibility through to implementation.

If you have the necessary qualifications and would like to be considered for this position, please call in or phone for an Application Form. Ames Personnel, Suite 14, Dryden Chambers, 119 Oxford Street, London, W1R 1PA.

AMES PERSONNEL 01-434 1106

The difference between a system that works and one that doesn't could be you

As an experienced operator, you're on the sharp end of the computing business. You know the difference between a suite of programs that will run smoothly and one that's going to create headaches.

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We're looking for a man or woman to help us get new and amended systems installed and working smoothly on our existing 1900 new dual 2970. Specifically, you'd be involved from the early stages of systems definition, and in specifying the groupings of programs into their operational jobs. Data security would also come under your sphere of activity, as would writing the job control language (George II and VME/B) and giving practical advice on systems, installation and testing.

At present, we see you as an operator plus — someone whose experience and intelligence is fast outgrowing just another ops job, and who knows George III at job description writing level.

As well as the salary we've quoted, we can offer you the chance to gain 2900 experience, plus the general experience that could be your springboard into operating management.

Lorraine Catherides will tell you more. Phone her on 01-921 6047.

J. Sainsbury Ltd., Stamford House, Stamford Street, London, SE1 9LL.

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Urgently required to work a major telecommunications contract in Iran. 1-2 years' contracts in Tehran. High tax-free salary plus excellent accommodation. Must have experience of network-based scheduling systems and be familiar with data processing and scheduling software packages to support critical path and project management techniques. Degree in engineering or construction management preferred.

Advanced Personnel Services Ltd. (Pty)
The White House, Lodge Road, London, NW4
Tel. 01-203 4272
or cable HEADHUNT LONDON

METROPOLITAN BOROUGH OF Rochdale

PROGRAMMER
(Computer Section)
AP.2/3 £2,883/£3,773
Treasurer's Department

The present installation comprises an ICL 64K 1902T with tapes and disc and communications equipment which will be replaced by an ICL 2980 system later this year. Substantial development of on-line systems is planned. A knowledge of 1900 Cobol is desirable. APPLICATION FORMS available by quoting Ref. No. B.5511 from the Chief Personnel Officer, 185 Drake Street, Rochdale OL16 1XG, to whom they should be returned by 30th July 1978.

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ANALYSTS

HONEYWELL

On-line systems. Experienced Senior Commercial Analysts required. Staff purchase and pension schemes.

MIDDX. £6500

MINI-COMPUTER ANALYSTS

Established international company seeks Analysts with mini-computer experience. Company makes commercial business systems. VRC experience useful, not essential.

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PDP

Travel abroad to a time systems project leadership, excellent salary and conditions. Experience of PDP machines essential.

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Large multi-national company requires a Senior Analyst with 4-5 years' experience. IBM background preferred. On-line and real-time systems opportunities.

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ICL

2 years' analysis experience with a COBOL background. This is a steady and growing role. GEOH and a knowledge of business essential.

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ICL

This is a very large and well-known company, using GEOH and ICL 1900. Experienced Senior Analyst required to assist in development. Pension scheme, free life assurance and company car.

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Self-motivated Analyst with good commercial experience and knowledge of operation systems for new development. Benefits include a relocation package, pension scheme and free life assurance.

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IBM

Our clients are looking for an experienced Project Leader for commercial consultancy work. Experience of Systems 3/30 or 14 preferred. Possibility to work abroad discussed.

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SYSTEM-3

At least 2 years as Analyst or Analyst/Programmer, with sound knowledge of RPGII. Good commercial background will help gain a good position in this company.

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AJK Consultants Limited
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IBM O/S installation offering generous salaries. Excellent prospects and benefits. 9 months — 3 years' experience.

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Good working conditions and many commercial on-line applications. IBM O/S installation offering relocation expenses, good prospects and generous holidays.

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Working on financial and banking applications, this company can offer non-contributory pension and mortgage assistance.

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An ICL 2903 installation requires a programmer to lead a development project and also assist in writing specifications. Some user contact. Social club and staff canteen.

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Programmers with mini computer experience in commercial fields are required urgently. VRC experience useful. Excellent salaries with good prospects. Opportunity for new languages.

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Well-known company seeking an assembler programmer or somebody with COBOL experience. On-Line and Real-Time systems are in operation.

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COBOL

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OPERATIONS SUPPORT

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1 year + IBM 370/OS experience. 3 shifts, subsidised canteen, excellent career path.

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COMPUTER WEEKLY, June 22, 1978

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The person (Male/Female) will be expected to control areas of the Company's business in an area north of the Midlands and will be directly responsible to the UK Sales Manager for the continuing business success in this area.

The successful person will probably possess a Degree or equivalent qualification and have experience in a technical sales environment. Experience in data processing or a computer related field is highly desirable. Proven field sales managerial experience is essential.

A basic salary commensurate with the responsibility of the position will be paid. A company car will be provided and the person will participate in a commission scheme.

An attractive contributory pension scheme is provided and assistance with relocation will be considered where appropriate.

Write with details of age, experience and current earnings to:

D. J. Kichenside,
Personnel Officer,
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Prospect House,
Thorn Street, Reading, Berks.

SENIOR DATA CONTROL CLERK

c £4000 + Shift Allowance
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A major brewery, based in West London and utilising twin ICL 1903Ts running under GLIS have a vacancy for a senior data control clerk.

The benefits, as one would expect from a company of this stature, are first class and include:

- ★ four weeks' holiday
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You will have at least two years' experience of controlling computer input/output and be capable of maintaining magnetic tape records.

A sociable shift pattern of 7.30 a.m. to 3.30 p.m. and 11.30 a.m. to 7.30 p.m. is worked on alternate weeks.

Interested? then for further information and an application form contact our CROYDON office quoting ref. CW 20-BS.

01-886 9683 (24 HOUR ANSWERPHONE) 19, PARK STREET, CROYDON, CR9 1TN | 061 236 2419 FAULKNER HOUSE, FAULKNER STREET, MANCHESTER, M1 4YD

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CAPP ASSOCIATES Computing Services Association
LONDON AND MANCHESTER



This advertisement is addressed to Systems Engineers, Systems Designers, Project Leaders, Systems and DP Managers because most of our senior people hold positions such as these today. We are still expanding rapidly and need to recruit staff and to become consultants. We are in particular looking for people with in-depth business systems experience in the Insurance, Manufacturing, Distribution and Transport industries. We are also looking for people with specialist skills in transaction-based systems, data base languages, terminal modes and communication networks.

As a consultant you will be required to undertake a variety of different assignments. You will certainly need to manage projects and you will lead in the multiple tasking, short-term approach to the management and control of computer projects. As a manager you will have full responsibility for keeping projects to schedule, within budget, and above all for producing a consistently high quality work for our clients. Where necessary you will be required to travel to new locations and developments.

Once you have proved your ability as a consultant, there are several different positions in which you could move. For example, you could become a Senior Consultant, responsible for major projects, a Project Manager, responsible for a number of consultancy and systems development projects, or you could take advantage of opportunities in other divisions of the Hoskyns Group, both in the U.K. and overseas. Hoskyns is part of an international group with sales in excess of £200 million.

If you would like to know more about the opportunities at Hoskyns, please send us a curriculum vitae or write or phone for an application form to:

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A Systems Company with over 600 professional staff,
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POSITIONS ENCOMPASS DEVELOPMENT ON IBM/ICL 1900/ICL 2900/BURROUGHS/HARDWARE.

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- ★ one year's + ASSEMBLER programming experience gained in an IBM (or alternative machine environment). OR
 - ★ one year's + PLAN experience gained in an ICL environment, and a knowledge of GEORGE III. OR
 - ★ two years' + COBOL experience gained ideally in an ICL 2900 series environment OR
 - ★ one year's + systems experience gained in any mainframe environment
 - ★ the necessary qualities and attitudes to work in close contact with clients
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LONDON 01-935 0671
Freeport 6, 102, Blandford Street,
London W1K 1JZ

Computing Services Association

GMC Greater Manchester Council
COUNTY ENGINEER'S DEPARTMENT
URBAN TRAFFIC CONTROL SECTION

SENIOR PROGRAMMER
£3882/£3812 including supplements (pay award pending)

AN OPPORTUNITY FOR SOMEONE WITH EXPERIENCE OF CORAL AND/OR TRAFFIC CONTROL SOFTWARE TO ENJOY A MAJOR ROLE IN THE GREATER MANCHESTER URBAN TRAFFIC CONTROL SCHEME.

The Urban Traffic Control Systems Group is due to have a traffic control computer system using four Ferranti Argus 700 S Computers installed at the end of 1978. The period up to the acceptance of this system will be used to ensure that the software is rigorously tested before commencing on-line operation. Commissioning of the system to control some 830 traffic signals over most of the area of the County will follow.

The Group now needs a Senior Programmer initially to work alongside the contractor to aid in the software integration testing of the system, subsequently he/she will be fully involved in commissioning the operational system on-line. Substantial further development of the system will follow.

For the first 6-8 months, the person appointed will work at the contractor's facility at Wythenshawe; on delivery of the computer system the work will move into the UTC computer centre in the centre of Manchester adjacent to County Hall.

Attractive conditions of service include: removal, legal, etc. expenses up to £750; lodging allowance; flexible working hours; staff restaurant.

Applications by letter, stating full details including qualifications, experience, age, salary and home and addresses of two referees to the County Personnel Officer, County Hall, Manchester, M2 5PP by 3rd July 1978.

ASHFORD BOROUGH COUNCIL
TREASURER'S DEPARTMENT

Computer Operations Supervisor
required — Grade AP3/4

Salary £3395 to £4214 (including salary supplements)

This is a Joint Computer Unit, operated by Ashford Borough Council and Shepway District Council, which is located at Ashford with ICL 2903 computer.

The job purpose is to control the day-to-day operations in the Computer Unit and to ensure prompt production of scheduled work. Duties include supervision and training of operations staff and controlling and scheduling of work to ensure the maximum use of the computer.

Excellent conditions of service include in appropriate cases:

- Council housing if required
- Removal expenses
- Settling in allowance of up to £100
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- Post entry training facilities available.

Closing date — 13th July, 1978

Application forms and Job Description available from: Chief Personnel Officer, 14/19 Church Road, Ashford, Kent, TN1 1AF. Ashford 24431, ext. 238.

Computer Technologist
— telecommunications facilities

Preece, Cardew & Rider are consulting engineers responsible for major projects both in the U.K. and overseas.

To assist in these telecommunications projects we require a specialist for the selection and application of relevant data processing equipment.

Primarily, the applications include:

- Directory enquiries
- Outside cable plant day-to-day operation and maintenance (generation of pair allocation and cross-connection data on a real-time basis).
- Computer-assisted operation and maintenance of long distance circuits, including real-time data retrieval and complex systems of selective data logging.
- Computer support for emergency services' control rooms.
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The applicant should have several years' experience of hardware capability and software design directly relevant to the above and, most important, an ability to identify and analyse functional problems and communicate fluently. Some level abroad will be necessary to liaise with clients, accept systems and advise on future applications and enhancements. Formal qualifications are desirable but not essential.

We offer an attractive starting salary and a full range of benefits — including generous overseas allowances and relocation assistance to this pleasant South Coast area as necessary.

Write in confidence for details giving concise history to:

The Personnel Manager, PCR Service Company,
Preston House, 165-167 Preston Road,
Brighton BN1 6AF,
Tel. Brighton 607131.

Job No 1470

ANALYST/PROG HOLLAND

Our client, a major organisation meeting the ground power needs of world's airlines, by engineering a broad range of products to clients in more than 100 nations. Retaining Honeywell 62/40 under GCOS, they seek persons with 2-3 years' COBOL experience. Co. offers

- * Responsibility as the No. 2 to the O.P.M.
- * Lots of user liaison
- * Variety of interesting applications with Honeywell IMS package
- * Excellent fringe benefits
- * Salary DFL 42-48000 (£12,000)

Ref. 1538

SNR PROGRAMMER HOLLAND

Our client, a major company based in Holland, is engaged in the supply of loudstuffs. They are seeking a senior programmer with at least 4 yrs' COBOL experience. Applications include production control and accounting. They retain IBM 370 115 under DOS VS. Co. offers

- * Possibilities of travel throughout the Netherlands
- * Relocation expenses
- * English-speaking environment
- * Excellent career prospects
- * Salary to DFL 42,000 (£10,000)

Ref. 1547

PL/I PROGRAMMERS HOLLAND

Our client, a major and successful concern, wishes to strengthen its European programming team. Retaining IBM 370 hardware under DOS/VS, Co. seeks ambitious person with PL/I CICS or COBOL an asset. Co. offers

- * Involvement in development of new projects
- * Opportunity to work with an expanding organisation operating world wide
- * Centrally based - Amsterdam
- * Salary 40,000 Guilders (£10,000) cost of living allowance and relocation expenses

Ref. 1212

SYSTEMS ANALYST HOLLAND

International company engaged in manufacturing distribution and sales of well-known commercial products, requires person with experience of either inventory, stock control, warehousing or sales forecasting systems. Successful candidate will form the company's distribution project and will be responsible for Company's efforts

- * Excellent opportunity for career progression.
- * Relocation expenses
- * Company runs Siemens equipment computer, able to IBM 370
- * Salary to 60,000 DFL (£15,000) + Bonus.

Ref. 1688

SNR ANALYST PROGRAMMER DUTCH/BELGIUM BORDERS

European division of American manufacturing Co. seeks potential EOP Manager with personality, drive and enthusiasm for their POP II installation. Applicant should have substantial amount of years in systems analysis and programming on POP II's with a good working knowledge of MUMPS. He/she will be involved in design and implementation of commercial end statistical systems integrated databases.

- * English-speaking Co.
- * RSX11-M operating system planned for implementation early next year
- * Salary to DFL 55,000 (£14,000 approx.)

Ref. 1645

ANALYST PROG HOLLAND

Our client, an international engineering company retaining IBM 370 hardware seeks an analyst programmer with minimum 3 years' COBOL experience. CICS VS would be an advantage. Company is situated in an historical University town close to Dutch/German border. Company offers

- * Relocation expenses
- * Working in new modern complex.
- * Excellent career prospects
- * Salary 40,000 Guilders (£10,000) + Bonus.

Ref. 1473

PROGRAMMERS MIDDLE EAST COUNTRIES

Our client is a major international organisation with offices throughout the world. They seek programmers and analysts in BAHRAIN & JEDDAH where their market is growing strongly. Ideal applicants will have COBOL and/or NEAT experience on NCR small business machines to work on an interesting variety of projects in a financial and commercial environment

- * Renewable one year permanent contract
- * Fully furnished accommodation provided at the company's expense
- * 30 day LEAVE per annum
- * Salary Paid in Bahrain Dollars £12,000 c. TAX FREE

Ref. 1583

PROGRAMMER SELOUIM

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- * Variety of projects in rapidly expanding company
- * Centrally based - BRUSSELS
- * English speaking environment
- * Settling in allowance for married or single persons
- * Salary approx. £18,000 p.a.

Ref. 1447

SYSTEMS ANALYST LONDON

Our client, a prestigious Merchant Bankers, are seeking a Systems Analyst who has immediate banking and investment experience. They retain IBM 370 under OS but will consider other hardware experience Co. offers

- * Full banking benefits including subsidised mortgage
- * Excellent working environment
- * Job security with prestigious name
- * Salary £7,500

Ref. 1504

SNR PROGRAMMER CITY

International financial concern retaining IBM 370 under OS are seeking a programmer with at least 3 years' COBOL experience. ICL 1900 equipment they offer excellent opportunities for persons with minimum 2 years' ICL COBOL experience. Co. offers

- * Home mortgage
- * Non-contributory pension scheme/life assurance
- * Exciting and interesting future development work
- * Training in CICS
- * Great promotional prospects
- * Salary £6,500

Ref. 1593

SENIOR ANALYSTS MIDOX

Our client, a major organisation, situated close to both M4 and M3 motorways, is seeking a senior analyst to act as PROJECT MANAGER on a wide range of applications. If you have approx. 3 years' experience preferably on ICL 1900 series equipment, and are able to demonstrate a professional approach to project management, apply NOW. Co. offers

- * Job security with a prestigious concern
- * Responsibility
- * Excellent working conditions
- * FREE lunches, FREE life insurance
- * Salary £6,500 + COMPANY CAR

Ref. 1529

JNR PROGS LONDON

Challenging careers awaits persons with approx. 12 months' programming experience on ANY MACHINE. ANY LANGUAGE with drive and enthusiasm who wants to follow a positive career path. Opportunities as follows

- * TRAINING in PL and database
- * Development work on new sophisticated systems
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- * Up to date technology
- * Salary to £4,500

Ref. 1550

ICL PROGS LONDON

Due to development of their advanced computer systems, successful O.P. services dept seeks to boost its programming team. Retaining large ICL 1900 equipment they offer excellent opportunities for persons with minimum 2 years' ICL COBOL experience. Co. offers

- * Opportunity to join at senior level
- * Training in ICLIMS database
- * Development to analysis
- * Applications in various areas providing an absorbing and interesting career
- * Excellent perks include flexi hour and 5 WEEKS' HOLIDAY
- * Salary £5,500

Ref. 1548

SYSTEMS ANALYSTS ESSSEX

Our client, a sophisticated computer and technology company, has openings for systems analysts. Retaining Honeywell 68/20 under GCOS they will take people with any hardware experience. Ideal applicant will have good business background with drive and ambition. Co. offers

- * Exciting and interesting work in up-to-date technology
- * Subsidised lunch, pension scheme plus other company benefits
- * Excellent career prospects
- * Sports and social club
- * Salary to £6,500

Ref. 1598

PL/I PROGRAMMER W. LONDON AREAS

As part of a prestige international group of companies, our client is now recruiting for programmers with 2/3 years' PL/I exp. and hopefully some ASSEMBLER for the development of manufacturing systems on the IBM Series/1 mini computer.

- * Excellent opportunity to be trained on mini computer
- * Versatility of IBM Series/1 in relation to IBM mainframe
- * Working with up-to-date technology
- * Excellent career opportunities including chance of working with microcomputers
- * Salary to £7,000

Ref. 1997

JUNIOR PROG LONDON

Our client, a prestige commodity brokers with offices throughout the world, are seeking PL/I programmers. They retain IBM 370 hardware and if you have 1 or more years experience apply NOW for this fantastic opportunity. Co. offers

- * TRAINING in other high level languages
- * TRAINING in software
- * TRAINING in systems generation
- * Salary £4,500 to start

Ref. 1519

MINI PROGS HANTS

Our client is a major British company with business interests in many areas. They seek programmer with at least 18 months' DEC POP and BASIC+ experience. This hardware is newly installed and thus offers a chance to become involved in the development from the beginning. Co. offers

- * Wide range of projects
- * FLEXI HOURS
- * Excellent career prospects
- * ANNUAL BONUS
- * Salary to £6,000

Ref. 1588

MINI PROGS LONDON HOME COUNTIES

Prestige company based in USA, Europe and UK are recruiting persons at varying levels (from prog to systems specialists) for their new city offices. Having large OEC PDP equipment they seek people with experience on any MINI but using ASSEMBLER. Co. offers

- * Extensive training up-to-date technology
- * Excellent career opportunities
- * Training in RSK, RTII and RSTS
- * Chance to travel abroad
- * Salary £6,000-£10,000 p.a.

Ref. 1478

SNR ANALYST/PROG WEST LONDON, BERKS

International company with outstanding reputation for efficiency, growth and investment are seeking senior analyst/programmers to work within IBM 370 installation. Good experience of PL/I or COBOL or ASSEMBLER is essential together with ability to work on own initiative and supervise staff. Working on teleprocessing and timesharing systems with opportunity to work on small business machines, co. offers

- * Exciting growth potential
- * Excellent promotional prospects
- * Non-contributory life assurance, sickness and pension scheme
- * Good working conditions
- * Salary to £8,000

Ref. 1568

ANALYST PROG CITY

Fantastic opportunity to join world-wide financial concern retaining IBM system 3 for a analyst programmer at varying levels with minimum 2 years' RPO II experience. Co. offers

- * Opportunity to attain PROJECT LEADER level
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Ref. 1547

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The expansion of these services create the need to appoint an Operations Controller who will take overall responsibility for:

- * Operations
- * Data Control
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The person appointed will report to the Data Centre Manager and will be responsible for on establishment of fourteen.

We would expect suitable candidates to have fulfilled a similar role or to have progressed through data control and operations to attain supervisory level. A sound knowledge of IBM hardware and utilities will be required, the installation runs under DOS VS with POWER and supports a teleprocessing network using SNAOOW.

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SYSTEMS DEVELOPMENT STAFF

West of Scotland

The Systems/Data Processing Department is responsible for the investigation, preparation and implementation of systems and procedures for manual and computerised applications. A wide range of projects ensures that the work is challenging and rewarding. In particular the department is currently concerned with the installation of on-line VOU systems related to the imminent installation of a DIGITAL EQUIPMENT COMPANY PDP 11/80. Applications being developed include production planning and scheduling and materials control. Future developments will include Standard Costing, Plant Maintenance, Personnel, Quality Control.

Applications are invited from a wide range of systems staff, with or without programming experience, who can show ability and willingness to work with a minimum of direction and can meet the needs of users at all levels.

Candidates seeking opportunity, security and large company benefits who meet the requirements should write for application form to:

The Personnel Adviser (Administration), CPC (United Kingdom) Ltd., Falside Road, Paisley, Tel 041-884 5111, Ext. 102.

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Our clients are a large manufacturing and marketing organisation. Their international business development group, based in London and Paris is expanding at 30% p.a. Publications are of a high-quality professional standard, with an emphasis on comprehension by non-technical readers.

To maintain and improve the Group's publications, they now seek a Technical Author with the ability to supervise a growing team. Additionally, the post offers the opportunity to:

- develop into a more senior management role in due course
- learn computing (or increase your knowledge) and use computers for text editing
- make occasional short visits to France and elsewhere abroad

The opening will appeal to experienced Technical Authors, not necessarily with a computing background, who are able to express themselves clearly and concisely in English, and to supervise staff. Candidates should be well educated (ideally a degree or professional qualification) and should have had significant relevant experience.

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An opportunity exists to join the Marketing Department of Sperry Univac in its UK Headquarters in London. Sperry Univac, as one of the world's leading computer suppliers, markets a comprehensive product range covering all sectors of the Data Processing Industry.

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Sperry Univac UK Headquarters, Sperry Univac Centre, London NW10 6LS, for an application form.

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1. Programmers with experience in Cobol, PL/1 or Assembler languages who have, or wish to have, systems involvement will be given the opportunity to implement small projects.
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ICI Plastics Division Bexford Manningtree Computer Services Section Leader

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The qualifications required are as follows:
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A high level of knowledge and experience of Merk IV.

An in-depth knowledge of IBM Job Control Language.

An appreciation of PL1.

The job holder will be given a broad experience in providing computer support to all areas of the business and will be given further training where necessary.

Interviews will be held in Management Services Department, Welwyn Garden City, the Headquarters of the Division, but the vacancy is based in Bexford in the attractive "Commutable" country.

The salary will be around £4,500 plus bonus, profit sharing, etc. There is scope for promotion.

Please apply in writing stating age, qualifications and experience to Mrs. Mary Barton, Personnel Department, ICI Plastics Division, Bassmead Road, Welwyn Garden City, Herts. Or telephone WGC 23400 ext. 2634.

ICI The Leaders in Plastics

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RESEARCH POST IN ECONOMICS

Applications are invited for a research post at University College London on a four-year programme of research on: Inflation, incentives and the distribution of income. The programme is financed by the ESRC and directed by Professor A. D. Johnson of UCL. M. A. King, of Birmingham, and N. A. Smith, of Warwick, the work will involve a substantial element of computing, particularly handling large-scale survey data and previous experience in this area is essential. The salary will be in the range £4,387 to £5,508, plus £480 London allowance.

For further details, apply to: Professor A. D. Johnson, UCL, Department of Economics, Gower Street, London WC1E 6BT.

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E.M.S. is planning substantial further development of both our Consultancy and Turnkey Systems Divisions during the coming months. Our consultancy activities extend across all mainframe ranges and encompass a wide range of Industrial/Commercial organisations. Applicants must, therefore, present as high level Business Analysts capable of rapidly assessing clients' requirements and proposing relevant solutions where appropriate or quantifying the relevant consulting experience required in either Systems or Programming and providing the necessary staff from E.M.S. resources. A vast potential market exists for salesmen marketing resource support.

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Candidates should have a flexible outlook and possess the ability to analyse and recommend solutions to a wide range of business problems. It is not necessary to have a programming background.

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PA Management Consultants BV

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Amsterdam office

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Basic Holdings Limited is replacing its existing RPG II programmer with an experienced programmer to develop and maintain its RPG II systems.

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Personnel Officer
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Tel: 01483 5341

IF YOU ARE A PROGRAMMER

Ring: MIP CONSULTANTS INTERNATIONAL

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NOW Agency

Systems Programmers for Customer Support

Experienced programmers will be interested in our vacancies for Customer Support in the Design Services Group. The work involves building new and enhanced operating systems and standard software products from components produced by the Software Development Group. These products are then supplied directly to users and, where appropriate, tailored to their special needs. Customer Support is our external interface to the customer for the supply of standard software. Follow-up responsibilities include consultancy, advising users on various facilities, investigation and solution of users' problems. In addition to the building and supply of standard products, opportunities exist for the development of special systems and analysing feedback from field experience to improve existing products.

Relevant programming experience includes mini-computer operating systems, industrial control systems, communications systems, on-line applications, customer support and liaison and the supply of mini-computer software packages.

These posts are based in South Manchester but may involve some travel to user sites in the UK and abroad. This is an area with excellent communication facilities which, whilst convenient for business, also provides fast access to leisure areas including the Macc District, North Wilmslow and the Lake District. Close proximity to both the Cheshire countryside and urban facilities make the area especially attractive.

The Company is long established in the design and manufacture of mini-computers and has an acknowledged international reputation. The usual large company benefits are available and appropriate relocation expenses will be met by the Company.

Please write, sending your Curriculum Vitae, to Mr. G. Turner, Services Manager, Design Department, Ferranti Computer Systems Limited, Simonsway, Wythenshawe, Manchester M22 5LA, quoting reference 78WD24CW or telephone 061-428 3844 ext. 200 (reverse charge) for further information.

FERRANTI
Computer Systems

HERTS/MIDDLESEX

NOTICE TO SYSTEMS ANALYSTS

Haymarket Computing are D.P. recruitment specialists to 35 companies in the Herts/Middlesex area. Such is the current computer employment market that at any one time almost all of these companies have vacancies for Analysts and/or Programmers. At the present moment, however, our most urgent need is for Analysts on behalf of 12 clients in the following areas -

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Hemel Hempstead
Hayes

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Harrow
Wembley
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The background of the people required should ideally be in the systems area, preferably Database On-line and they should be able to demonstrate the ability to control systems projects.

The application areas although sophisticated, are extremely interesting and job interest being of the greatest importance these days, can certainly be offered.

In addition the career opportunity can certainly be demonstrated and it is indeed a company that welcomes ambitious and talented people.

PLEASE TELEPHONE OR WRITE IMMEDIATELY FOR MORE DETAILS.

BOWATER SCOTT CORP LTD GRAVESEND, KENT COMPUTER OPERATOR (£3,750 including shift allowance)

Applications are invited for the post of Computer Operator from persons with at least 2 years exp of ICL 1900 & 1901. To operate at 114k 110121 and a 064k 1903A Monday to Friday 08.30-17.00.

The installations of a 2960 & 3216 110121 to replace the existing machines will take place during July 1978. Training will be given.

Career & Social Club facilities are provided together with pension scheme. Free membership of BUPA and 4 weeks' holidays per year.

Please apply to:

Mr. E. H. Finn
Administration Services Manager
Bowater Scott Corp Ltd
Cresthill Road
Gravesend
Kent
Tel: Gravesend 84488 ext 285

OPERATIONS STAFF CONTRACT OR PERMANENT

Computer operators and data preparation operators required on IBM UNIVAC, HONEYWELL and ICL equipment.

Salary range per week:

£90 - £120
£160 - £180
£450 - £600

Telephone now for more information:

OPERATIONS ASSISTANCE LIMITED

LONDON: 4 MARK MOON ST
LONDON, W1
01-492 8754
MANCHESTER: 226 ROYAL EXCHANGE
CHORLTON
MANCHESTER, M2
061-222 9243

LECTURER II IN COMPUTING

Applications are invited for the above post on a full-time basis. The successful candidate will be responsible for the teaching of Computing throughout the University.

Applicants should be well qualified in the teaching of Computing and have a minimum of 5 years' experience in the field. A Ph.D. is essential and a minimum of 3 years' experience in the field of Computing is required.

Applicants should send their curriculum vitae and three references to the Secretary, The Institute of Computing, 100 Brook Road, Wokingham, RG40 3AB.

Telephone Wokingham 0428 7911. Closing date for applications 10 July 1978.

NATURAL ENVIRONMENT RESEARCH COUNCIL

INSTITUTE OF OCEANOGRAPHIC SCIENCES SCIENTIFIC OFFICER/HIGHER SCIENTIFIC OFFICER NUMERICAL METHODS IN WAVE RESEARCH

The Institute of Oceanographic Sciences is undertaking its existing research in numerical modelling of the dynamics of high waves and is looking for someone with high ability in numerical analysis to work on this project.

A good honours degree or equivalent qualification in Mathematics or Computing with methods in fluid mechanics is desirable. At least 2 years' relevant post graduate experience is required for Higher Scientific Officer.

Salary and Conditions

Appointments will be made as a Scientific Officer (H.S.O.) or Higher Scientific Officer (H.S.O.), depending on qualifications and experience, on the following salary scale: £50,283 p.a. - £64,115 p.a. H.S.O. £64,115 p.a. - £84,486 p.a. Starting pay may be above the minimum.

Staff of the Council are not Civil Servants, but their pay and conditions are similar to those of the Civil Service.

There is a non-contributory pension scheme and generous leave allowance.

Application forms and further particulars are obtainable from:

The Secretary, The Institute of Oceanographic Sciences, Brook Road, Wokingham, RG40 3AB.

Telephone Wokingham 0428 7911. Closing date for applications 10 July 1978.

NATURAL ENVIRONMENT RESEARCH COUNCIL

COMPUTER PROGRAMMER/ANALYST North Sea Oil Aberdeen

Occidental, one of the most progressive and successful companies operating in the North Sea, have a small, highly-skilled team of computer specialists, who play a significant role in providing technical and commercial data processing services to the entire operation.

The increase in these activities has created an opportunity for an experienced Programmer/Analyst who can take on the complete responsibility for developing and maintaining programmes and systems for a wide range of engineering applications, with the minimum of guidance.

Candidates, male or female, should have an engineering degree and a minimum of 4 years experience in technical data processing, preferably including a chemical process control application. Familiarity with time-sharing and date-base techniques and experience in linear programming or APL would be helpful. Initiative and enthusiasm will be encouraged and our progressive approach to technical innovation guarantees a stimulating working atmosphere.

A competitive salary is offered, and fringe benefits will include free life insurance and generous relocation assistance where appropriate. If you have the necessary qualifications and experience, and are seeking a challenging and rewarding career with a forward-looking company, please apply in writing, giving brief personal and career details to:

Mrs. Ann Reynolds,
Occidental Petroleum (Caledonia) Limited,
127 Causewayhead,
Aberdeen,
AB2 3TP.

Profit from **oxy** our progress

OVERSEAS POSITIONS

Openings presently exist for OPERATOR TECHNICIANS to work in foreign locations on mini-computer based system data processing systems. Successful applicants should have H.N.C. or military equipment, with at least one year's experience working with mini-computers and peripherals.

Send resume to JANET MITCHELL
Western Geophysical Company
289-290 Weston Road, Isleworth, Middlesex.

What would make you take on a computer job in Aberdeen?

The place?

Aberdeen, the Granite City, is almost certainly one of the most beautiful cities in Europe. It is surrounded by the scenic attractions of the Scottish Highlands and has for many years been one of the United Kingdom's main fishing ports. But now with the advent of North Sea Oil, it is an even more prosperous and thriving community. Aberdeen is a port, a University town, an excellent shopping centre, a forward looking city with a great future.

The life?

All year round Aberdeen is a hive of activity, that goes for anything from mountain climbing to music making. It is only to be expected from the city that gave Scotland her first painter, her first performed play, her first poet, and all of Britain its first University course in Medicine! A city of sport, of the arts, of learning—a city with a rich past and an equally rich present.

The climate?

Our climate is generally good, with hot summers that have made Aberdeen a popular holiday resort and sharp winters, which are an advantage for the winter sportsman or woman. We are within easy reach of Aviemore and Glenshee, with the Grampian mountains on the doorstep.

The employer?

The North of Scotland Hydro-Electric Board is responsible for supplying electricity to over 25% of the landmass of Great Britain. We know our business and do our job well. Our accounting and engineering departments make extensive use of our computers and are now expanding their computer based activities.

The money?

The panel opposite gives an idea of the salary scales we are offering, but the actual salary will depend entirely on you. Your experience and ability are what we need and we are willing to pay for it. If you are looking for a real career with opportunities for advancement in a growing organisation look no further. Assistance will be given with moving expenses where necessary.

The challenge?

We are now expanding our computer centre in Aberdeen and will be installing a large new configuration with a comprehensive terminal network to replace our existing ICL System 4 computers. Engineering programs extend through generation, transmission and distribution. Commercial activity—apart from billing, payroll and accounting—will be extensively developed into management accounting and enquiry processing. A challenge indeed, but if you think you can meet it read on.

Commercial

SENIOR SYSTEMS DESIGNER

£5495-£7145
Minimum of 4 years' experience, ability to control projects.

SYSTEMS ANALYSIS

£3985-£6130
Minimum experience 2 years. Knowledge of business practice or O&M on advantage.

Programming

SENIOR PROGRAMMER

£4660-£6130
Minimum of 3 years' Cobol experience. Ability to lead projects.

PROGRAMMER

£3985-£5470
Minimum of 18 months' Cobol experience.

Engineering

SENIOR SYSTEMS DESIGNER

£5495-£7145
Minimum of 4 years' experience, ability to control projects.

SYSTEMS ANALYSIS

£3985-£6130
Minimum experience 2 years. Engineering background or qualification on advantage.

Salary and conditions of employment are in accordance with the NJC Agreement for the Electricity Supply Industry with placing on PAG Grade plus productivity payment currently giving the total earning potentials as shown above.
If you are interested and want to know more about any of the above posts, contact our Computer Services Manager now.

**North of Scotland Hydro-Electric Board,
Computing and Accounting Centre,
Ashgrove Road West, Aberdeen AB9 2NY Telephone (0224) 692671**

Informatix UK & O'seas Index

Phone 01-831 6055

Informatix 24 Gray's Inn Road London WC1X 8HR Telex 299539 HAVEN G



POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
Systems Analyst	c £6,500	Software House	Central London	IBM/Mini	Unusual opportunity for an analyst with commercial systems experience to develop projects from proposal through to implementation on a variety of machines.	25/1
Graduates/Programmers	to £5,500	Bureau	Surrey	Any	Graduates with Engineering, Maths, or Computing Degree and FORTRAN required to work on software/scientific applications. 2 years+ programmers also required.	25/2
Programmers	to £6,500	Commercial Services	Sussex based	DS/PDP, etc.	Programmers with ASSEMBLER/COBOL experience required to develop commercial systems for a wide range of clients.	25/3
Senior Analyst/Project Manager	£12,000+ TAX FREE Accom ++	International Airline	Middle East	IBM DOS	Extensive experience of Airline Schedule planning. Previous experience of Operational Research to establish and statistical background of statistical advantage.	25/4
Programmers/Analysts	to £8,000 +	Banking	EC4	PDP11	Excellent employment package available to analysts/programmers with in-depth knowledge of systems and programming preferably with real-time experience.	25/5
Analysts/Programmers	to £9,000 TAX FREE Accom ++	Construction Services	Middle East	IBM DOS	Urgently required - analysts/programmers with 2 years+ IBM COBOL experience to work on financial/planning applications. 1-year renewable contracts available.	25/6
Analysts/Programmers/Engineers	to £8,000 + bonus + Car allow	Systems House	S.W. Essex	PDP	18 months+ experience of working on Minis in commercial environment. Able to work on two initiatives.	25/7
Consultants/Programmers	c £7,500	Software House	E. Dorset	Mini	Mini-computer professionals with commercial and real time experience urgently required for this well-established organisation.	25/8
Senior Systems Analyst	c £6,300	Import/Export	ED2 and European Travel	IBM 370/148	Solid systems experience, including work on minis and telecommunications systems and responsibility for implementation of at least one major system.	25/9
Analyst/Programmer & Programmer	to £7,000	Bureau	EC1	Barraghe	Programmers with Barraghe COBOL on middle range machines urgently required for interesting and varied work in a stimulating environment.	25/10
Systems Analyst	to £8,000 + car	Equipment Manufacturer	Central London	Intelligent terminals	Openings for self-starters with 3 years+ analysis experience who wish to enjoy a challenging and satisfying career.	25/11
Systems Analyst	£10,000 TAX FREE Accom ++	Service Bureau	Saudi Arabia	IBM DOS	Versatile systems analyst required to work on demanding projects in service environment.	25/12
Analyst/Programmers	£5,500	Systems Support	Central & SE London	IBM/1900	Unique opportunity for IBM COBOL/PLAN/DRIVER person to learn IBM.	25/13
Project Leaders	to £12,000 +	Manufacturer	Switzerland	PDP11	OP professionals with air-based systems and programming software experience and a degree or equivalent required for these challenging positions.	25/14
Contract Personnel	£180+ p.w.	Various	London SE England	IBM, ICL, Barraghe, DEC Honeywell	COBOL, RPOH, Assembler, PL/I, BASIC+, programmers with 2 years+ experience urgently required.	25/15
Systems Programmers	to £11,000 TAX FREE Accom ++	Engineering Consultancy	Middle East	IBM DOS	Systems programmers with DOS/VS POWER to maintain/evaluate manufacturers software and system time. Required for 1-year renewable contracts.	25/16

CENTRAL LONDON & MIDDLE EAST PROJECT LEADERS ANALYST/PROGRAMMERS + PROFIT SHARE BONUS

Our clients, an International Software House with Headquarters based in Central London, have signed several turnkey projects overseas and are urgently seeking ambitious people to develop their systems in London. In view of planned expansion staff are required at all levels to join Project Teams to implement systems on-site. Applications range from general commercial systems to the more specific: airlines, hotels and financial on-line systems.

Project Leaders

With a background of analysis and programming and experience in leading a team of at least six. Capable of organising turnkey systems including implementation and training.

Analyst/Programmers

Experienced in writing detailed systems and programming specifications and able to deal with first-time users in an overseas environment.

Programmers

Who can cope with challenging projects within this Software House. Languages are immaterial although much of the work is based on Minis and a knowledge of BASIC would be an advantage.

Generous overseas allowances and accommodation are available whilst working abroad. Interviews are being held throughout the months of June and July and offers will be made to successful candidates within one week.

UK SALARY
to £8,500+
to £6,750+
to £6,500+
+ PROFIT SHARE BONUS

THE SALES BIT

Resistance to change —PART III

IN the computer business, particularly with first-time users, many of the objections put forward are symptomatic of resistance to change.

There are usually two reasons why people object to change: either it makes them feel insecure or it creates an apparently unnecessary hassle, or both. The introduction of new ideas and methods can also bring extra work, re-investment, politics — and so on.

In such a situation it is necessary for the salesman to gear his selling strategy towards motivating the client into a positive frame of mind. He must work towards overcoming the inertia that the prospect of change can bring about. This can only be done by convincing the client that the changes being proposed will be to the ultimate benefit of his company and himself.

Resistance to change creates its own special "flak", which comes in the form of a wide variety of objections.

The salesman's best way of handling such reactions is to establish his own list of likely objections and also to create a corresponding list of "BUT IF" rebuttals, which can be called on when the need arises.

Here are a few objections to start you off. See what "BUT IF" rebuttals you can counter them with. Then why not get together with

the rest of your sales team and compile a master-list of answers to the kind of objections you are likely to come across?

i: We're not ready for computers.
ii: We have too many other problems at present.
iii: It will cost too much.
iv: The unions will never agree.
v: We've been through all this before.
vi: Our existing methods are adequate.
vii: We will have to change our present systems.
viii: We don't have any real problems.
ix: Who else has installed such a system?
x: We have a computer at head office.
xi: Your system wouldn't work here.
xii: That doesn't apply to us.
xiii: That's against company policy.
xiv: I'm far too busy to get involved.
xv: We'll give it some consideration.
xvi: Our requirements are unique.
xvii: It's more trouble than it's worth.
xviii: Your package is not comprehensive enough.
xix: We couldn't consider having our files off the premises.
xx: We just took delivery of a computer system from one of your competitors.
Ah well, you can't win them all — but you can keep in touch!

TRADER

Opportunities in the Midlands

● From page 21

swinging back the other way and Midlands companies were again buying their own hardware. Many firms found that interactive computers were unnecessary and invested in minicomputers.

If they needed no more then separate computers to deal with, say, invoicing and wages, it was not difficult to invest in enough hardware to suit their particular needs.

This diversity provides an abundance of choice for computer staff coming to the Midlands, as David Cross, Careers Officer for Aston University in Birmingham, confirmed.

"We are finding an absolutely astronomical demand from people with large installations down to people who are going into the microprocessor field. The demand is very wide," he said.

"There is only a proportion of people who are prepared to take on staff and then train them from scratch, but we never have any difficulty in finding jobs. It is a long time when I had an unemployed computer scientist on the books."

Aston University is unequivocally oriented towards science and technology and due to the current boom in the Midlands and elsewhere, it has been re-evaluated by starting a new course.

Cross explained that students at Aston could take an honours degree with a computer science option where it would be

combined with such subjects as maths, business studies, architecture and urban planning.

The newly started course was a BSc in computer science, from which students would start graduating in three years' time. "I think this was created as a response to the demand," said Cross.

A spokesman for the University of Birmingham said it had seen an enormous computer commitment.

"We do a lot of teaching, both for people going into the computer business and for people going into other walks of life who want to know about computers," he said.

The use of computers has exploded in the field of research, for which the University is renowned, and it therefore employs a number of computer staff of its own. A new interactive computer costing £500,000 is to be installed at Birmingham University next year.

Puzzle answer

It is clearly 1, and this helps considerably with the analysis of the units column. Y and L can only be 1, 3, 7 or 9, since 9Y and 9L are primes.

E = 1 rules out 1, and also 9 (because Y and L are complements modulo 9). G must surely be 8 or 9, so the calculation is well on its way. The solution is, in fact, 457 + 9,623 + 3,501 = 13,581.

SALESMAN PROGRAMMERS JUNIOR PROGRAMMERS

CCF is a rapidly growing city-based consultancy, systems house and timesharing bureau specialising in commercial and financial business systems.

We require experienced computer professionals and juniors with ambition, energy and drive to share in our challenging expansion plans.

SALESMAN
Must be self-motivated, an excellent communicator with a proven sales record. Potential to become Sales Director with an equity stake in the company.

Total remuneration should in the first year be in five figures with fringe benefits.

PROGRAMMERS/JUNIOR PROGRAMMERS
Must be mini and/or micro computer experience with some programming background. A group of business financial applications would be an advantage.

Salary according to experience in the range £3,000-£6,000 p.a. + bonus.

Write or telephone the Managing Director
CONSULTANTS (COMPUTER & FINANCIAL) LIMITED
BLOMFIELD HOUSE
88 LONDON WALL
LONDON, EC2M 7AD
TELEPHONE: 01-888 4291



GUILDFORD OPERATORS/COBOL PROGRAMMERS

required by established Independent Service Bureau.

The company provides a wide range of package and commercial systems for clients throughout southern England.

The company is currently upgrading to Burroughs 6100 series hardware and wishes to recruit Operators and Cobol Programmers with 2 years' experience preferably gained on Burroughs medium system or B1700/1800 computers. The company offers a good working environment and attractive salaries geared to experience.

Telephone or write giving full career experience to:
Richard Fullerton, Operations Manager
Incomputer Ltd.
Robertson House, Leach Road, Guildford, Surrey
Tel. 0482 75212

SYSTEMS PROGRAMMER ICL 1900/2900 £ negotiable

Our client is a successful manufacturing company located not too far from London along the M1 motorway.

They are currently running an ICL 1903T, 126K with George II+ which will be shortly supplemented by a 2980 running under DME initially and then VME/B. Teleprocessing and graphics are both well established. Future plans may include databases and complex manufacturing applications software.

This is a first-class opportunity for an experienced ICL systems programmer to extend his or her technical experience and achieve a position of influence in this expanding installation.

You should have experience of FORTRAN or COBOL and be familiar with PLAN. Knowledge of 1900 teleprocessing software such as Detadrive, TPS 1900 would be very useful and previous experience of 1900/2900 conversion would be an asset.

Salary will be high and negotiable and the company offers package of fringe benefits which includes generous relocation expenses.

For more information please telephone Sylvia Walton, or write to:

Castle Computer Services Limited

271 High Street, Bournemouth, Hants, BHW 1PH Phone: (04427) 73181

MEOWAY BOROUGH COUNCIL

SENIOR ANALYST/PROGRAMMER

£5,362 to £5,926 p.a. inclusive
(Pay Award under negotiation)

This new post, reporting directly to the Computer Manager, is intended to lead one of two small teams involved in furthering the Council's computer development programme. The existing 2103, with EDS80s and M T 1s will be enhanced to handle a wider range of applications and on-line systems.

The Computer Section is based in Chatham Town Centre, with excellent shopping facilities and good road and rail links to London, the Kent countryside and coast.

Applicants should have good systems and programming experience, including COBOL and communications.

Housing accommodation and assistance with relocation expenses may be given in appropriate cases.

For application form and job description contact the Chief Personnel Officer, Council Offices, Finsbury Hill, Strand, Rochester, Kent ME2 4HR. Telephone Meadway (0684) 70831, ext. 22, or, for further details, telephone Mr. Bourne or Mr. Hill on Meadway (0684) 402020.

Closing date for applications 10th July, 1978

CSC
FREELANCERS
Some immediate project requirements.

IBM OS COBOL
IBM OS COBOL
IBM MARK 4 COBOL
SYSTEMS ANALYST
IBM OS/VS BASIC

Central Systems Consultants
12 Hylfryn Close, Inner Park Road, London SW19 6EA
Telephone: 01-799 2144

Herts.
City, Surrey
W. End
Herts
City

SHELTER, the National Campaign for the Homeless, needs a bright, capable person to supervise a group of volunteers engaged in maintaining a register of homeless people. Some clerical work and liaison with other agencies.

Salary £3,000-£3,248
Please apply to: Rachel Belfrage, at 01-439 6377, or write to: Shelter, 197 Finchley Road, FRI 6JH

Knight is right for contract staff
Knight Computer Services Ltd.
14 Old Park Lane,
London W1Y 4NL

01-491 4706

South West Thames Regional Health Authority

SHIFT LEADER From £5659*
SENIOR OPERATOR From £4497*
OPERATOR From £3800*

The introduction of 2 shift working has created the need for additional operations staff to be based at the regional computer centre located in the grounds of The Springfield Hospital, Tooting, London SW17.

Current hardware includes a powerful ICL 1903T running under George 3 therefore applicants should have worked on ICL 1900 hardware, preferably in a George 3 environment.

The Shift Leader and Senior Operator posts will be of particular interest to people currently holding these posts who have attained a good technical standard in George 1 and now wish to develop their supervisory and management skills.

The person appointed as Shift Leader will be responsible for all computer room activities in addition to which he or she will be expected to liaise closely with other operations department section heads.

For further details phone Les King up to 8 p.m. or write to Modern Computer Services Limited, FREEPOST, London WC2N 5BR. 01-839 3351.

*Includes shift allowance and London weighting.

Freelance **MODEM** Permanent Positions
 Consultants in Data Processing

Canterbury City Council

Senior Systems Analyst/Programmer

AP5/SOI £4343-£5085 (incl.) (pay award pending)

Applications are invited for the above position from suitably qualified and experienced persons. The Council operates an ICL 1901A computer at the present time but this is to be replaced in October 1978 with an ICL 2902 using DOS KOs and VDU's linked by a 7502 to the mainframe. The new computer will be housed in a purpose built computer centre on the premises of the Airborne City of Canterbury. The position offers a first-class opportunity for a computer professional to obtain job satisfaction from working on complex projects and also to become involved in the Council's plans for the implementation of its new systems.

A Casual User Car Allowance is payable. Consideration will be given to housing accommodation and a generous disturbance allowance scheme is in operation.

Closing date 7th July 1978. Interview date 17th July 1978.

Application forms may be obtained from the Personnel Officer, 3 Marlborough Avenue, Canterbury, Kent CT1 2ON. Telephone: Canterbury 51765 Ext. 12.

LONDON SCHOOL OF BUSINESS
 URBIDGE TECHNICAL COLLEGE, 3 Marlborough Avenue, Uxbridge, Middlesex.
 Department of Science & General Studies

LECTURER (GRADE II)
 in Computing

Required for September 1978 graduates in a suitable discipline to teach Computer subjects and some Mathematics throughout the College.

Teaching qualification and relevant experience in industry, research or teaching desirable.

Salary £2000-£2871 plus supplement plus London Allowance.

Application forms and further particulars from the Personnel Officer, Uxbridge Technical College, Park Road, Uxbridge, Middlesex, UB8 3PH.

ANALYST/PROGRAMMER

LONDON £7,000

The International Data Centre of an American Bank, located in London, requires a Senior Analyst/Programmer to join its systems and programming team. Current hardware is ICL based but the planned development programme will replace this with IBM S/370 equipment.

Futuro software will include OS/COBOL, C.I.C.S. and I.D.M.S.

The ideal candidate for this position will have at least 4 years' experience in the design and programming of on-line systems. A knowledge of banking systems would be a considerable asset.

A salary of around £7,000 is offered together with an attractive benefit package that includes mortgage subsidy, travel loans, non-contributory pension and Life Assurance schemes.

For a preliminary discussion contact Ian Bacon.

Interviews can be arranged in London.

Ian Bacon, Gemini Computer Systems Ltd.
 40, St. Mary's Road, Weybridge, Surrey TW16 7PL.
 Tel: 0181 891 1971. Telex: 940000.

GEMINI Recruitment

MYRIAD OPERATIONS
 Computer Personnel Consultants

OPERATORS

Are you interested in:

- ★ New IBM 370/138
- ★ DOS/VS POWER
- ★ T.P. Network
- ★ East London
- ★ 2 Shifts covering 7.30 a.m. - 10.30 p.m.
- ★ c £4,000
- ★ Good Training and Career Prospects

If you would like to know more about this excellent opportunity ring now quoting reference E1/2208.

24-hour answering service
 Please telephone for a confidential discussion or write:
 30 Fleet Street London EC4A 3DF
 01-353 0981

CLIENT SERVICE MANAGER

LONDON, W.1

£7,500

We are looking for a dynamic and flexible person to manage the servicing of several hundred small firms using our computerized accounting service. Technical experience is less important than a sound grasp of the disciplines of the computer.

We expect you to have a strong knowledge of commercial accounting.

For further details ring:

JACK SCHUMANN on 01-580 0085 or write to
 BOX NO. 1988, Computer Weekly, Dorset House
 Stamford Street, London SE1 9LU

PROGRAMMERS
ANALYST/PROGRAMMERS TO £3999 PLUS
SUPPLEMENTS AND PROFIT SHARE

CHESHIRE

Our client, a large commercial organisation in North Cheshire, are seeking IBM COBOL or ASSEMBLY. Preferably in a large user environment. The company offer possibly the best sports and social amenities available in the north of England.

SYSTEMS PROGRAMMER TO £4900
ANALYSTS TO £4900
PROGRAMMERS TO £4600
PLUS 10% IN AUGUST

PRESTON

A medium-sized 1900 user in Preston are seeking six experienced staff. The Systems Programmer must have GEORGE 11 with PLAN and will preferably have some COBOL experience. The Analysts and Programmers will have a commercial 1900 COBOL background.

SYSTEMS PROGRAMMER
SYSTEMS DESIGNERS
UP TO £6200
LEEDS

A large 370 user in Leeds are seeking additional staff for their developing DP department. The Systems Programmer must have an Assembly background and the Systems Designer, COBOL, preferably gained on IBM hardware. In addition to salaries, there is a productivity bonus and profit sharing scheme and relocation expenses will be paid.

PROGRAMMERS TO £5000
ANALYST/PROGRAMMERS TO £5200
SENIOR OPERATORS TO £4000
MERSEYSIDE

One of the largest 370 users in the north require a number of experienced DP staff. Analysts, Programmers and Programmers must have good commercial COBOL experience. Senior Operators must have a large operating system/hardware background. The company offer attractive fringe benefits and where appropriate will pay relocation expenses.

PROGRAMMERS, ANALYST PROGRAMMERS
ANALYSTS, PROJECT LEADERS TO £7500
+ BONUS

MANCHESTER OR LONDON

The organisation are recognised as being the leaders in their field in the UK and Europe. Due to the increase in current projects experienced staff are required. IBM, COBOL, PL1 or BAL plus DB or TP.

CONTRACT REQUIREMENTS

ZURICH, ANALYST PROGRAMMERS, PL1 COBOL with CICS.
 GENEVA, ANALYST PROGRAMMERS, PDP 11/70
 MANCHESTER, PROGRAMMER 2904 with operations experience
 MANCHESTER/YORKSHIRE, PROGRAMMERS, COBOL, CICS
 MANCHESTER, PROGRAMMERS PL1 IMS

The above requirements are for a number of years. Some positions are contract only. Why not ring us today to reach your own staff requirements?

Ian Bacon, Gemini Computer Systems Ltd.
 40, St. Mary's Road, Weybridge, Surrey TW16 7PL.
 Tel: 0181 891 1971. Telex: 940000.

GEMINI Recruitment

Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth
 Block 3 (The Inter-Block Gap)

Cleo has engineered Hex's release from captivity in Sprocket's Hole by having Bill Boatstrap's dope vector. Hex has looked up Ascii over an asynchronous serial interface and is driving him by remote control for fear that his own logic circuits have been damaged.

As they veered and swerved their way from the log cabin, Hex several times turned Ascii in the wrong direction, bumping into Cleo, and once sent him charging full astern, breaking the data link and causing a costly delay while he ran back to retrieve the dog.

"It's not very easy steering him," Hex said defensively. "He investigates on polar co-ordinates, whereas I'm a Cartesian myself."

Cleo just rubbed her bruise in silence. "This is not going very well," thought Hex. "I was supposed to be riding to her rescue on my shining charger but instead she rescued me, and now it looks as though I'm holding her back."

Unfortunately the split-second lapse in concentration caused by this thought was enough to send Ascii plunging off the path again.

He careered wildly across the uneven ground and then juddered to a halt buried nose-deep in some loose gravel. Hex tugged at his tail while Cleo went round in his head and helped push. With some effort they managed to extricate him and roll him back onto the path.

Gradually Hex began to get the knack of controlling Ascii's four-wheel drive; and once they were out of sight of Sprocket's Hole he turned on the headlamps so that they could at least see where they were going. Their progress, which had been extremely erratic, began to pick up, and the tension between them eased. When he felt he had mastered the technique, he offered her a lift on Ascii's back.

"All right," she said, climbing aboard, "I'll try anything once."

"Ready?" "Checks eyes!" Hex revved Ascii up to full throttle, and let go of the brake. Ascii leapt forward, his wheels churning up a spray of dirt. Cleo hung on with one hand, waving

the other above her head. She seemed to be enjoying her ride. Thus, with Hex bumping alongside, they ventured and jolted their way through the night, mostly uphill.

As dawn was breaking they came to the crest of yet another hill. They had now attained a height of 2,903 metres and on both sides the mountains of the southern Sierra Nueva (New Range) towered even higher. In front of them, stretched out in the sunrise, was a magnificent view over the fertile plain. Cleo dismounted and shook the dust from her dress. "Where do we go from here?" she asked.

"That's what we had better decide now," said Hex. "I think we should first find some shelter and maybe try to get some sleep. We're going to have to travel mainly by night so we might as well get used to sleeping in the daytime. We also need to devise a plan of action."

They moved off the trail and climbed a short distance into the hills. Hex hoped to find a little cave or at least an overhanging ledge where they might be safe from observation, but before long they were met by a sheer wall of almost vertical rock.

Hex shrugged and, admitting defeat, began the difficult manoeuvre of turning Ascii through 180 degrees. But the dog's wheels headed down into the scree, spinning uselessly. Hex wedged his shoulder under Ascii's chin and his legs firmly against the rock face and heaved for all he was worth.

Hex heard a sharp crack then a loud grinding sound. She spun round to see Hex and Ascii disappearing beneath the surface of the earth. She rushed over and peered down into the hole into which they had vanished so suddenly.

"Are you all right?" she called.

Hex's answer echoed back: "Yes, come on in. It's just what we were looking for."

She lowered herself cautiously into the opening. Soon she too was sliding headlong down a long dark chute. Then she burst out into the light again at the mouth of the tunnel. Hex and Ascii lay spreadeagled.

on a bank of soft green moss just ahead of the point where she had come to rest. They were enclosed in the bowl of a small circular crater, possibly volcanic, with steep rock walls all round and a tiny lake, looking unnaturally blue, in the middle. Much of the crater's bed was covered in a bright green moss, and a single monkey-puzzle tree grew by the side of the pond.

Hex's eyes met hers. "I think I found an inter-block gap," he said, smiling. "Not a bad little hiding place," she replied.

They rolled Ascii out into the sunshine to re-charge his solar cells, then went down to the water to drink. Cleo gulped it down greedily, though it was ice cold, for she was very thirsty. Heaving slaked their thirst, they returned to the side of the crater near the entrance tunnel and sat down.

"What shall I call you?" asked Cleo out of the blue. "We've never been introduced. I know you're the Hexadecimal Kid; but that's a bit of a mouthful."

"Well, my friends call me Hex, but my real name is Samuel Synapse."

"I'm going to call you Sam then," she declared with deliberation. "That suits me," he replied. "And what's your full name?"

"My full name is even fuller than yours, I'm afraid. My father was half Greek, you see. The part most people can pronounce is Cleopatra Calculus, but I'd prefer it if you'd just stick to Cleo. Now, if you don't mind, Sam, I'm going to get some sleep."

She turned over and curled up. Hex took off his greatcoat and spread it over her. So fast had she fallen asleep that she just mumbled a groggy thank-you without opening her eyes.

Sam Hex turned it over in his mind. A new name seemed as good a way as any to start a new life. But he was too sleepy to pursue that train of thought, and drifted off into unconsciousness.

Our three have found a resting place, but will they be able to get out again? More thrills and spills next week.

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BOOKS

Just two words—'good buy'

Introduction to Pascal, by C. A. G. Webster, 152 pp. £5.50. Heyden & Son, Spectrum House, Alderley Park, Cheshire, Cheshire, Cheshire, Cheshire.

ALTHOUGH intended to be used as a textbook for a first course in computer programming, Mr Webster's book is equally applicable to the experienced reader. The actual content is of a high standard. The method of development of the language is well

thought out and logical. It leads the reader through gradually expanding his or her view of the capabilities of Pascal.

Exercises are provided at the end of each chapter. Unfortunately solutions to selected examples only are provided. (Perhaps this is forgivable in what is primarily a course textbook.) Structured programming is used throughout the book. The only criticisms I have to make are two: minor points. Firstly, chapter one

"The status of Pascal as a computer programming language" which puts it in context historically, would be better as an appendix. Secondly, there is the use of flowcharts. Surely in this day and age they have no place in such a text!

To summarise: this is a book which I am proud to add to my collection. At £5.50 for a hard cover edition it is definitely a "Good Buy", especially in these days of escalating prices.

PETER WILLIAMS

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